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Relationship of Physical Health Risk Screenings in Seriously Mentally Ill with Self-efficacy for Health, Perception of Health Risk, and Intention to Follow-up with Medical Care.

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RELATIONSHIP OF PHYSICAL HEALTH RISK SCREENINGS IN SERIOUSLY MENTALLY ILL WITH SELF-EFFICACY FOR HEALTH, PERCEPTION OF HEALTH RISK, AND INTENTION TO FOLLOW-UP WITH MEDICAL CARE

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This dissertation is approved as a creditable and independent investigation by a candidate for the Doctor of Philosophy in nursing degree and is acceptable for meeting the dissertation requirements for this degree. Acceptance of this does not imply that the conclusions reached by the candidate are necessarily the conclusions of the major department.

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I wish to dedicate this research project to my children, friends, family, and wise advisors. The six years spent on this meandering, difficult, and sometimes nearly overwhelming endeavor grew me in many ways as a person, educator, and researcher, but most of all in existential ways. The meaning of learning is gained in the process more than in the outcome. Sweet people and God have set me on this path of calling to reach individuals with mental illness.

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ABBREVIATIONS

Blood Pressure (BP)

Body Mass Index (BMI)

Electronic Medical Record (EMR)

Health Improvement Profile (HIP)

Health Risk Screening (HRS)

Heart Rate (HR)

Protection Motivation Theory (PMT)

Serious Mental Illness (SMI)

Waist Circumference (WC)

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ABSTRACT

RELATIONSHIP OF PHYSICAL HEALTH RISK SCREENING IN SERIOUSLY MENTALLY ILL WITH SELF-EFFICACY FOR HEALTH, PERCEPTION OF HEALTH RISK, AND INTENTION TO FOLLOW-UP WITH MEDICAL CARE

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Morbidity and mortality occur at higher rates in those with serious mental illness (SMI) than those without SMI. These higher rates are worsening in degree, despite known preventative strategies, such as physical health risk screening (HRS). This study evaluates the relationship of physical HRS with self-efficacy for health prevention behaviors, perception of level of risk of health consequences, and intention to follow up with medical care for identified health risks. The study considers Protection Motivation Theory (PMT) factors related to HRS in individuals with SMI. A HRS tool was administered to 54 adult ambulatory clients from the Midwestern United States that met diagnostic criteria for SMI. The HRS, the Health Improvement Profile (HIP), was tested for relationship to: self-efficacy for health prevention behaviors, awareness of risk for health consequences (perceived threat), and intention to follow-up with medical care for health risks. Physical health risk scores were found to lack relationship to perceived level of risk. Self-Efficacy for health, measured by the Self-Reported Abilities for Health Practices (SRAHP) was found to significantly relate to physical health risk level and perceived health risk. Regression analysis including SRAHP, health risk score, employment status, months of mental illness, and number of supplements was able to infer level of perceived health risk, accounting for 36% of the variance. Self-efficacy for

health, as a component of PMT, is salient to HRS in those with SMI, and warrants further investigation as an intervention to improve intention to take health protective behav

Chapter 1

Introduction

The National Institute of Mental Health (2016b) estimated that, in 2014, there were 9.8 million adults aged 18 or older in the United States with mental illness (Substance Abuse and Mental Health Services Administration, 2016). This number represented four percent of all United States adults. Individuals with mental illness have higher health risk than individuals without mental illness (Laursen, Nordentoft, & Mortensen, 2014; Razzano et al. 2015; Vancampfort et al., 2014). In addition, screening for physical health risk in those with mental illness occurs at a significantly lower frequency than in those without mental illness (Lord, Malone, & Mitchell, 2010). Once identified physical health risks including cardiovascular problems (Lahti et al., 2012), cancer (Musuuza et al., 2013), and other health risks (Emerson, Williams, & Gordon, 2016) are inadequately treated on an ongoing basis in individuals with mental illness (Goodrich, Kilbourne, Nord, & Bauer, 2013; Moore, Shiers, Daly, Mitchell, & Gaughran, 2015).

Screening rates are less frequent for individuals with mental illness than those without, despite elevated health risks in this population (Cornell et al., 2010; Kilbourne, Lai, Bowersox, Pirraglia, & Bauer, 2011; Lord et al., 2010). For example, inadequate screening exists for elevated body mass index (BMI) and waist circumference (Mitchell, Delaffon, Vancampfort, Correll, & De Hert, 2012) among other health risks. Several different strategies have been utilized to improve screening rates with limited, sustained effect (Tosh, Clifton, Xia, & White, 2014).

Screening for physical health risk is not sufficient to ensure attention to physical health risks and pursuit of ongoing care. Study shows that individuals with SMI, despite being high risk for physical health consequences, even when screened for these risks, follow-up and obtain physical health care at rates lower than individuals with mental illness (Goodrich et al., 2013; Moore et al., 2015). Health behaviors do not directly follow identification of risk (McGinty, Baller, Azrin, Juliano-Bult, & Daumit, 2016; Moore et al., 2015) and are difficult to predict (Milne, Sherran, & Orbell, 2000). Protection Motivation Theory (PMT) seeks to improve understanding of and thus ability to improve positive health behaviors or protection motivation. PMT as it relates to this study will be described next.

The PMT guides this study and hypothesizes that health behaviors are chosen by individuals after cognitive appraisal of both the threat (perceived risk) and coping (adaptive response) aspects regarding that behavior (Milne et al., 2010). The coping appraisal aspect of the PMT considers self-efficacy and response efficacy. Self-efficacy is the individual's perceived ability to carry out an adaptive response or positive health behavior (Plotnikoff et al., 2010). Self-efficacy has previously been shown to help individuals in two ways: First, it increases the likelihood of their intent to act and second, it leads to positive changes in health behavior actions (Sheeran et al., 2016). PMT also recognizes the significance that self-efficacy plays in motivating individuals to develop stronger intentions to make significant adaptive health changes (Plotnikoff et al., 2010).

Health risk screening (HRS) is a tool that may improve outcomes by increasing awareness and perception of physical health risks. Perception of risk is a key aspect of the PMT. The PMT suggests that a predictive relationship exists between cognitive

appraisal factors or perception of risk and eventual health. Protective (positive) behaviors (Floyd, Prentice-Dunn, Rogers, & Pren, 2000; Ch'ng & Glendon, 2014). Included in PMT is consideration of intention to act or protection motivation. Additionally, intention to act potentially leads to increased follow-up with primary medical care providers.

Self-efficacy for health is also a key concept in the PMT. Specific measures of self-efficacy are predictive of specific health behaviors (Betz, 2013). The development of health risk screening (HRS) approaches founded upon understanding of the aspects of self-efficacy and cognitive appraisal improve effectiveness of health interventions and identify intention to engage in healthy behaviors in individuals with mental illness (Floyd et al., 2000; Leas & McCabe, 2007; Ruiter, Kessels, Peters, & Kok, 2014).

Biological measures such as blood pressure, BMI, and waist circumference are important indicators of health and relate to health actions according to the PMT (Mirkarimi et al., 2015; Tulloch et al. 2009). Study of the relationship of HRS to biological measures is important to improve processes used in health risk screening and health interventions in individuals with mental illness (Bartlem et al., 2014; Emerson et al., 2016).

Serious mental illness (SMI) is defined as an individual with significantly impairing mental illness such as major depression, schizoaffective disorder, schizophrenia, or bipolar disorder according to the Substance Abuse and Mental Health Services Administration (SAMHSA) (2016). Those with SMI have chronic mental health symptoms which limit functioning, according to established SMI criteria (SAMHSA, 2016). Not included in the SMI designation are those with an exclusive

anxiety disorder, attention deficit disorder, brief psychotic illness, substance use disorder, or adjustment disorder. These diagnoses are not included in the group of individuals with SMI since they are typically not chronic or severe enough to meet the criteria of at least one year of duration or chronic course of illness and symptoms in these disorders does not limit functioning enough to be considered serious (National Institute of Health, 2016b).

The phenomenon of interest for this study is identification of the relationship of physical health risk screening and associated components of the PMT with intention of individuals with serious mental illness to follow-up and receive ongoing care after determining their health risk. There is excessive morbidity and mortality in individuals with SMI. Individuals with SMI also have inadequate rates of identification and ongoing care for health risks for medical illnesses. There is limited research regarding the best ways to maximize health risk screening and follow-up in ongoing care for persons with SMI. HRS is a tool that may improve outcomes by increasing awareness and perception of physical health risks and encourage both intention to act, health behaviors (protection motivation) identified in PMT, and follow-up with primary medical care providers for ongoing care. Engagement in ongoing follow-up may be key to improving HRS rates and strengthening treatment for health risks.

Literature demonstrates low levels of health risk screening and intervention in individuals with SMI. Despite availability of health risk screening and preventative interventions for those with SMI, there are low rates of engagement in ongoing care (Moore et al., 2015). Factors that may interfere with health risk screening in individuals with SMI is discussed including environmental factors, stigma, and illness related

factors. Study linking PMT components to health risk screening and intention to follow-up in ongoing care is discussed. The use of PMT principles of self-efficacy and cognitive appraisal when implementing HRS improve intention to engage in healthy behaviors is highlighted. The study goal is to measure the relationship of physical HRS using HIP with intention to seek ongoing care for health risks.

Statement of Problem

Individuals with SMI experience lower rates of ongoing health care, fewer health risk screenings, and inadequate interventions for identified health risks (Goodrich et al., 2013; Moore et al., 2015). Physical HRS is recommended by health care consensus groups and well accepted by individuals with SMI but is not implemented at adequate rates (Kilbourne et al., 2011). Several factors are associated with inadequate health risk screening in individuals with SMI. Interventions targeting physical health risk in individuals with SMI improve rates of screening, but individuals with mental illness remain significantly less likely to be screened even after adjustments for factors such as rural location and underserved health care setting (Osborn et al., 2011). Typically, HRS completed with individuals with SMI, is unstructured and informal (Baller, McGinty, Azin, Juliano-Bult, & Daumit, 2015).

The informal nature of HRS in SMI may be a reason for low overall rates of physical health risk screening (Xiong et al., 2015). Additionally, once individuals with SMI receive HRS they have low rates of follow-up in ongoing care to target identified health risks (Moore et al., 2015). This study targets the use of a formal HRS tool, the Serious Mental Illness Health Improvement Profile (HIP), which includes one-on-one discussion with the individual with SMI about recommended follow-up care for

identified physical health risks. The use of a formal HRS tool, the HIP, may improve rates of health risk screening of individuals with SMI.

Purpose of the study

The purpose of the study is to identify relationships among physical health risk screening components (study variables) and the intent to obtain follow-up care for identified health risks. Intention to obtain follow-up care for identified health risk is a positive health behavior which meets the criteria of protection motivation as described in the PMT. The study also quantifies the relationship of HRS and PMT components of self-efficacy for health behaviors and perceived health risk (vulnerability to health consequences). The PMT component, self-efficacy, has been shown to positively contribute to intent to act and to actual change in health behaviors (Sheeran et al., 2016). PMT components are quantified as to their relationship with intent to follow-up in ongoing care.

Significance and Background

Premature Mortality in Mental Illness

Overall, individuals with mental illness experience morbidity and death at earlier ages than those without mental illness (Laursen et al., 2014; Razzano et al. 2015; Vancampfort et al., 2014). They develop medical illnesses at substantially younger ages (Viron & Stern, 2010). Some research indicates these illnesses arise decades earlier (Colton & Manderscheid, 2006) or an average of 20 years earlier than for those individuals without mental illness (Laursen et al., 2014). They also suffer from medical illnesses at a rate up to four times that of those without mental illness (Davidson, Judd, Jolley, Hocking, & Thompson, 2000). For example, high rates of conditions that raise

cardiovascular risk occur in individuals with mental illness, such as diabetes, dyslipidemia, hypertension, (Razzano et al. 2015; Vancampfort et al., 2014) and obesity (Lahti et al., 2012; Lawrence, Hancock, & Kisley, 2013; Roshanaei-Moghaddam & Katon, 2009; Slomka et al., 2012). Even more disconcerting, 20% of individuals with SMI demonstrate multiple unhealthy behaviors which raise cardiovascular risk (Vermeulen-Smit, Ten Have, Van Laar, & De Graaf, 2015). Cardiovascular risk factors can be addressed more effectively if HRS interventions are optimized to reduce death risk (Xiong et al., 2015).

Morbidity and mortality continue to rise in individuals with mental illness despite available preventative strategies to reduce health consequences (Laursen at al., 2014; Saha, Chant, & McGrath, 2007). A sizable portion of the increased morbidity is accounted for by lack of health screening (Xiong et al., 2015). Health risk screening has the potential to positively impact metabolic parameters (Fernandez-San-Martin et al., 2014) and cardiovascular risk (Ahmed, Blaha, Nasir, Rivera, & Blumenthal, 2012). Despite high receptivity to health risk screening and intervention (Beebe & Harris, 2013) among those with SMI, these strategies are offered only 29% of the time (Cornell et al., 2010; Kilbourne et al., 2011; Lord et al., 2010). HRS is hindered by stigma, lack of resources (Pitmen, Osborn, Wright, Nazareth, & King, 2011), and lack of connection to primary care (Horvitz-Lennon, Kilbourne, & Pincus, 2006).

Excess mortality remains in those with mental illness even when HRS rates have improved (Osborn et al., 2011; Saha et al., 2007, Scott & Happell, 2011). Higher mortality and morbidity rates at younger ages appear to be worsening instead of improving (Scott & Happell, 2011). This may be because screenings are informal and

once screened individuals with SMI do not follow-up in ongoing care for identified health risks. For HRS to be effective it must include assessment, brief advice, and referral or follow-up (Bartlem et al., 2014). There is a critical need for standardized, effective approaches to assess physical health risk. Additionally, HRS that includes multiple components (McGinty et al., 2016) and considers collaborative care components such as primary care (Ronsley, Raghuram, Davidson, & Panagiotopoulos, 2011) can maximize effectiveness. It is imperative to encourage follow-up care to reduce health risk, cardiovascular events, and cost of care in individuals with SMI (Reddigan, Ardern, Riddell, & Kuk, 2011). Medical providers understanding regarding effective HRS has the potential to provide foundation and impetus for improved health promotion interventions for those with mental illness (Rosenbaum et al., 2014).

Nurses Role in Physical Health Screening in Serious Mental Illness

Nurses are ideally situated to impact cardiovascular and other physical health risks in those with mental illness (Happell, Scott, & Platania-Phung, 2013) due to their critical thinking abilities. Nurses, with appropriate education, can assist with physical health risk screening. Nurses can assist by facilitating laboratory orders, obtaining biological parameters (vital signs), communication between provider and client, and implementation of practice routines, such as implementation of HRS instruments (Rosenbaum et al., 2014; White, Hemingway, & Stephenson, 2014).

Nurse provided care coordination for individuals with SMI has been shown to lower medical morbidity (Shattell, Donnelly, Scheyett, & Cyddeback, 2011) and increase screening rates for cardiovascular risk, specifically waist circumference (Rosenbaum et al., 2014). In addition, nurse-led clinics in diabetic care improves control

of hyperlipidemia (Wallymahmed, Morgan, Gill, & MacFarlane, 2011) and diabetes (Davidson, Blanco-Castellanos, & Duran, 2007; Huang, Wu, Jeng, & Lin, 2009).

Such evidence indicates mental health nurses are well equipped to provide physical health risk screenings and referrals for primary care follow-up. Mental health nurses in conjunction with other providers in mental health care should help ensure that physical health checks and protocols are carried out (Bradshaw & Pedley, 2012; Nash, 2011; Robson & Gray, 2007). Community mental health nurses are especially active in encouraging follow-up care for individuals with mental health needs. Mental health community nurses initiate contact with primary care 57% of the time, a significantly higher proportion of the time than inpatient care nurses. Inpatient nurses contact primary care 27% of the time (Happell, Platania-Phung, Scott, & Nankivell, 2014). This is especially important because contact with primary care has the potential to promote HRS in SMI.

Nurses are concerned with the need for follow-up after health risks are identified. Because of this concern the benefits of follow-up care are more likely to ensue (Happell, Scott, Nankivell & Platania-Phung, 2013). Nurse have the skills and compassion needed to encourage individuals with SMI to participate in HRS, which can improve screening rates (Smith et al., 2007). Use of nurse case managers (Kahn et al., 2009) and nurse care navigators (Griswold, Homish, Pastore, & Leonard, 2010) encourages primary care follow-up for those with mental illness.

A nurse-based intervention utilizing HRS and physical health monitoring was well-accepted and valued by clients with mental illness (Sutherland & Davis, 2010). Even though HRS done by nurses is accepted and valued by clients with mental illness,

these screening processes can be intensive and costly to maintain and sustain (Morden, Mistler, Weeks, & Bartels, 2009; Palinkas, Ell, Hansen, Cabassa, & Wells, 2010; Vasudev & Martindale, 2010). Improving HRS requires communication among providers and consumers, including primary care, specialty mental health care, and consumers (Morden et al., 2009; Palinkas et al., 2010). Brief, standardized, clinically-validated tools which require only limited resources for nurses to administer can improve health parameters and foster collaborative care (van Meijel, van Hamersveld, van Gool, van der Bijl, & van Harten, 2015).

Protection Motivation Theory

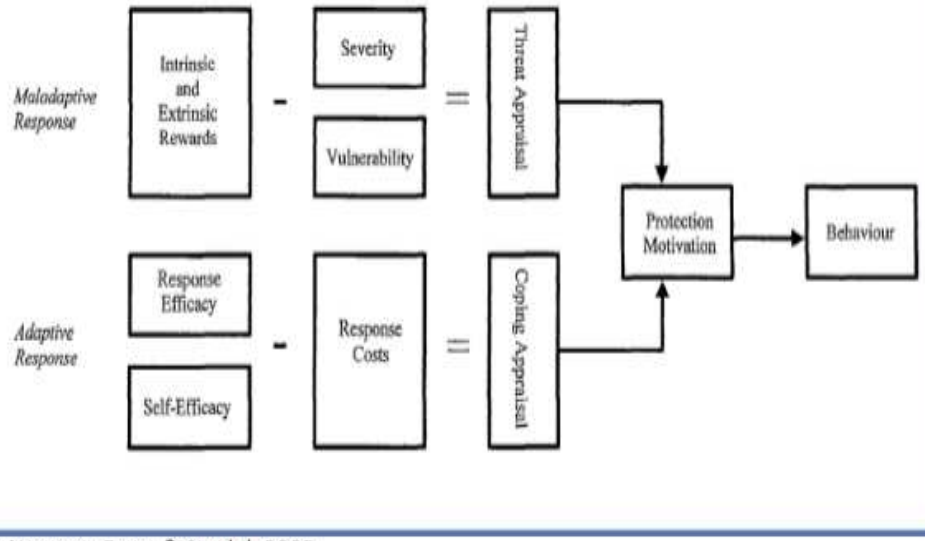
A social cognitive model, protection motivation theory (PMT), underpins the design and analysis of this study. Social cognitive models have been criticized for explaining only intentions to make behavior change (Schwarzer, 2008), not change in behaviors (Boer & Seydel, 1996). The PMT, however has been shown to predict behavioral outcomes in areas of health risk and a variety of non-health related areas where risk reduction is desired (Neuwirth, Dunwoody, & Griffin, 2000). For example, studies have related PMT to several health outcomes including, exercise (Bui, Mullan, & McCaffery, 2013; Plotnikoff et al., 2010; Tulloch et al., 2009), obesity management (Ho, Kwei, & Xiao-Yuan, 2015), and healthy eating (Scarpa & Theine, 2011). PMT components have been shown to predict safe sexual practices and sexually transmitted disease incidences (Chambers et al., 2016; Umeh, 2005). Incorporation of PMT principles have facilitated reduction of use when applied to substance abuse (Banerjee & Greene, 2013) and tobacco (Yan et al., 2014). PMT has also been applied to cancer screening areas such as breast cancer (Boer & Seydel, 1996; Hodgkins & Orbell, 1998),

Papanicolau (pap) tests (Gu, Chan, Twinn, & Choi, 2012), and prostate cancer (Odedina et al., 2004).

An overview of the PMT components follows (See Figure 1). The PMT hypothesizes that cognitive appraisal influences intention to act regarding health behaviors. Figure one illustrates the process in which sources of information lead to health protective behavior (Norman, Boer, & Seydel, 2005). Sources of information, according to PMT include environmental and interpersonal sources. Cognitive appraisal develops to interpret information as either a threat (threat appraisal) or an opportunity to use coping behavior (coping appraisal). Coping factors are self-efficacy, response efficacy, and response cost (barriers). Threat factors include perceived vulnerability (risk of health consequences) and perceived severity. In this study perceived risk (threat) of future health consequences is measures, however the concept of perceived threat is minimally defined in the literature. Perceived threat severity is measured by the HRS with HIP. Perceived vulnerability is measured by self-report in this study. Cognitive factors influence protection motivation (intention to act). Figure one illustrates the process, proposed by PMT, in which sources of information lead to health protective behavior.

Coping appraisal has a strong, predictable, and positive relationship with health behaviors, while threat appraisal has a limited and negative impact on health protection motivation (Plotnikoff & Higginbotham, 2002). The coping appraisal components of self- efficacy and response-efficacy have a direct positive relationship with protection motivation (intention to act) and actions of both current and future behaviors (Floyd et al., 2000).

Figure 1.
Summary of PMT perspective of cognitive processes that influence risk appraisal and protection motivation (intention to act) and eventual behavioral action



Note: From Norman, Boer, & Seydel, 2005

Figure 1. PMT Cognitive Processes

Intrinsic and extrinsic rewards (facilitators) are the perceived benefits individuals identify that relate to the health behavior. Rewards offset threat appraisal. Much of the existing literature of HRS in SMI focuses on this early portion of the PMT model and identification of the rewards (facilitators) and response costs (barriers) to health behaviors to reduce health risk. The later portions of the process, threat and coping appraisal have more significant influence on intention to act to reduce health risks (Floyd et al. 2000), with coping appraisal having the most influence.

Coping appraisal components will be discussed next. Self-efficacy of an action is the individual's evaluation of the likelihood that such action can reduce the threat. The

PMT, unlike several other cognitive health promotion theories (Babbin & Craciun, 2007; Schwarzer, 2008), considers the concept of self-efficacy of ability to act to reduce the physical health risk (Ho, Kwei, & Xiao-Yuan, 2015; Ruiter et al., 2014). Self-efficacy for health is the specific type of self-efficacy that is in effect when health risk and behaviors are considered (Gandoy-Crego, Clemente, Gomez-Cantorna, Gonzalez-Rodriguez, & Reig-Botella, 2016). Another factor that lends to coping appraisal is response efficacy. Response-efficacy is the belief that a specific response will reduce the threat or risk to health (Floyd et al., 2000).

Components later in the process of cognitive appraisal (farther right on Figure 1. are severity, vulnerability, and response costs). Perception of risk or threat can engender action consideration in the PMT model (Sheeran, Harris, & Epton, 2014). Severity and vulnerability are concepts that include perceived risk of consequences to health. Barriers are included in the response costs component of the model. Further description is given in chapter two of the subcomponents of PMT shown in this model. Chapter two also examines research of PMT subcomponents, and their relationship with protection motivation (intention to act) and specific health behaviors.

Summary HRS relationship to Current Study Concepts and PMT

Research regarding HRS is often guided by cognitive theories of health promotion which typically do not focus on the action phase of health and have minimal study in SMI (Leas & McCabe, 2007). However, PMT incorporates intention to implement action and institution of behavioral changes, thus improving clinical utility and application in HRS research (Babbin & Craciun, 2007). The PMT theory, a social-cognitive model has been proposed to have moderate power to explain relationships

between cognitive processes of health promotion and to predict health promotion (protection motivation) behaviors (Plotnikoff et al., 2010). The PMT underlies the current study development, implementation plan, and interpretation. The PMT is used in formulation of conclusions and recommendations for future study.

Theory-driven, formalized HRS is implemented so comparisons can be made between physical health risk and biological measures, such as body mass index and weight. Knowing the relationship between health risk level and biological measures can improve understanding of the HRS process. HRS is also related to self-efficacy for health, which has been shown to have a significant relationship with intended actions. For example, self-efficacy has been found to predict avoidance of tobacco use (Sterling, Ford, Park, & McAlister, 2014) ability to abstain from alcohol (Glozah, Adu, & Komesuor, 2015), and cancer prevention behaviors (Sakhvidi et al., 2015). Threat appraisal, measured as perceived risk level, can quantify PMT conceptualizations of cognitive processes fostering action to reduce risks (Ch'ng & Glendon, 2014).

Appendix E describes the main measures in addition to the HRS and intention to follow-up in care used in the study. The table summarizes reasons for measuring these concepts and their relationship to the theoretical framework underpinning the study, PMT. The main reason for measuring self-efficacy for health, perceived risks of health consequences, and intention to obtain care for identified physical health risks is that these concepts are important in the conceptual framework PMT and have been shown in previous research to influence protection motivation (health behaviors). The self-efficacy for health concept is measured using the Self-Rated Abilities for Health Practices (SRAHP) tool. The SRAHP tool was designed to measure self-efficacy for

health, a component included in PMT aspects of coping appraisal (Becker, Stuifbergen, Soo, & Hall, 1993). Perceived risk of health consequences is quantified by a self-report question to measure the threat appraisal aspect of PMT.

Risk Appraisal, Perceived Risk, and Health Risk Screening

Perceived risk is a significant aspect of cognitive threat appraisal, according to PMT, and thus is relevant to measure within the HRS (Bassett & Ginis, 2011). In addition, perceived risk has been quantified in populations without mental illness to include perception of vulnerability and severity of risk for health consequences (Bui et al., 2013). Risk appraisal as described by the PMT includes measurement of perceived risk to physical health (Floyd et al., 2002; Plotnikoff & Higginbotham, 2002; Rogers, 1975).

Perception of risk has limited study in individuals with SMI. However, Leas & McCabe (2007) studied perceived physical health risk or vulnerability in developing heart disease with individuals with schizophrenia. Also, perceived severity of physical health risk was found to relate to maladaptive coping behaviors instead of health protective behaviors (Leas & McCabe, 2007). Maladaptive coping could be either intentional avoidance of healthy behaviors or inadvertent failure to attend to identified health risks.

Perceived risk has more influence on intention to act to reduce risk when self-efficacy is high (Sheeran et al., 2014). Vulnerability and severity of risk of heart disease was noted to be predictive of physical activity intention and actual physical activity behaviors in individuals with schizophrenia. HRS improves individuals' with SMI awareness of the severity level of physical health consequences (Emerson et al., 2016).

HRS Utilizing the Health Improvement Profile in SMI

HRS interventions are, often opportunistic instead of formally arranged (Holt & Peveler, 2010) and focus on one health risk area limiting their impact (Bartels et al., 2013; Casagrande et al., 2011; Vandelanotte, Spathones, Eakins, & Owens, 2007; Vazin et al., 2016). Administration of HRS to individuals with SMI can be done systematically using the Serious Mental Illness Health Improvement Profile (HIP). This tool has advantages of being clinically validated, requiring only limited training in administration (three hours), allowing administration by nurses, and offering an immediate score or numerical rating of physical health risk as a total HIP score (Shuel, White, Jones, & Gray, 2010).

The HIP is clinically validated in individuals with SMI in several countries (Hardy & Gray, 2010). The HIP rates several physical health risk areas and offers concise feedback recommendations for the individual, (White, Hardy, & Gray, 2012) thus allowing recommendations to be given to the individuals to follow-up with primary care and potentially improving the individual's awareness of their physical health risks. Brief feedback has been studied with the use of the HIP physical HRS tool. The HIP study tools for physical health risk screening for both male and female participants are in included in Appendix D.

Aim of the Study

The aim is to identify the relationship of the study variables of perceived health risk (vulnerability to health consequences), self-efficacy for health, and physical health risk score (in the HIP tool) with intention to follow-up (protection motivation) in primary care for persons with SMI.

Research Question 1

1. Does perceived health risk, self-efficacy for health, and physical health risk score infer intention to follow-up with primary care in persons with SMI?

Research Question 2

2. a. What is the relationship between physical health risk score and perceived health risk level for physical health problems in persons with SMI?

2.b. What is the relationship between physical health risk score and self-efficacy for health in persons with SMI?

Research Question 3

3. What is the relationship between physical health risk score and perceived health risk level?

Definition of Terms

Physical Activity.

Physical activity is reported bodily movement produced by skeletal muscles that requires energy expenditure (World Health Organization, 2016). Typically, physical activity is measured as activity which raises heart rate. For this study, physical activity will be activity done for a period of 20 minutes in a single day and is included at any level of exertion. Examples would include walking or activity done for 20 minutes as part of daily living. Daily living activity could include sweeping, mopping, laundry, or meal preparation. Physical activity is defined as the physical activity level as reported on the HIP health risk screening. Activity is the self-reported number of days where 20

minutes of physical activity occurred per week as reported by participants (White et al., 2012).

Physical Variables.

Physical outcome variables measured are vital signs of heart rate (HR) and blood pressure (BP), body mass index (BMI), weight, height, and waist circumference (WC). At risk (red), or adequate health status (green) of physical variables will be identified according to HIP manual (White et al., 2012). The HIP manual does not specify the measurement sensitivity level for physical variables, thus measurement to nearest 0.5 unit is used.

Weight.

Weight is measured without shoes with a balance beam scale and reported to the closest kilogram (rounded up if equal to or greater than 0.5 cm above a whole number and down if below. The weight measurement is also used to determine the BMI.

Height.

Height is measured from the floor to the top of the person's head touching the wall (Mirrian-Webster Dictionary, 2017). Height is measured wearing no shoes, socks, or any head accessories. The individual stands up as straight as possible with heels, back, shoulders, and head all touching the wall. Heels placed together, head tucked, looking straight ahead. A straight edge is placed along on top of the person's head touching the wall. Height measurement follows the HIP manual (White et al., 2012). Height was measured to use in the combined variable of BMI. A stadiometer was not used for assessing height for any of the participants as data collection was done in

community settings without access to height measurement equipment for recovery group participants.

Waist Circumference.

Waist circumference (WC) is the length in centimeters (cm) around the abdomen, just above the hipbones, measured after breathing out (National Institute of Health, 2016a). WC is measured with a tape measure and recorded as length in centimeters (cm) following the protocol recommended by the HIP administration manual (White et al., 2012). Waist circumference equal to or greater than 80 cm females and 94 cm in males indicates a health risk (red score) per the HIP manual protocol. Waist circumference was recorded to the nearest centimeter. WC was rounded up if it was equal to or greater than 0.5 centimeter above a whole number and down if below.

BMI.

BMI is an estimate of body fat and a gauge of risk for diseases that can occur with more body fat (National Institute of Health, 2016a). The calculation of BMI uses the National Heart Lung and Blood Institute (NHLB) approach (NHLB, 2000) including weight in kilograms and height in centimeters (measured without shoes) and is reported to the nearest whole number (rounded up if equal to or over 0.5 above a whole number and down if below). Individuals are designated as being at risk according to BMI score if BMI is equal to or greater than 25.0 for both male and female participants (NHLB, 20016; White et al., 2012).

This designation of risk compared to no risk BMI numbers used were those described in the HIP administration manual (White et al., 2012). These BMI cut-off

numbers for physical health risk were identified by review of literature by the HIP authors.

Perceived Risk.

Risk is "a danger to self or the potential for physical or emotional harm, injury, or loss" (Shatell, 2004, p12). Risk as applied to physical health is defined as the chance or possibility of loss or harm (Shatell, 2004) related to physical health. For individuals with SMI, the application of the concept of risk includes "decision-making process … weighing possibilities and probabilities" regarding physical health risk (Shatell, 2004, p13) or health vulnerability. Risk is operationally defined as the individual's response to a one-item question requesting a rating of the individual's perceived risk of a physical health consequence in the future. The perceived risk of health consequences item was researcher developed. Single items to measure perceived risk have been previously used with PMT based study (Ch'ng & Glendon, 2014).

Self-efficacy.

Self-efficacy is the personal belief that the individual is or is not capable of performing a behavior (Bandura, 1982). General self-efficacy is the belief in one's competence to cope with a broad range of stressful or challenging demands (Luscyscinzki Sholtz, & Schwarzer, 2005). Self-efficacy is most accurately quantified as the self-efficacy for a specific task according to Bandura (1977). Self-efficacy for health is the level of perceived self-efficacy to cope and deal with problems and issues related to health (Gandoy-Crego et al., 2016). The operational definition of self-efficacy for this study is the score obtained on the Self-Reported Abilities for Health Practices (SRAHP) scale (Becker et al., 1993).

Seriously Mentally Ill.

Seriously mentally ill are individuals with a significantly impairing mental illness such as major depression, schizoaffective disorder, schizophrenia, or bipolar disorder that includes chronic mental health symptoms which limit functioning (SAHMSA, 2016). SMI is operationally defined as under treatment for a mental health condition and diagnosed as meeting criteria for schizophrenia, schizoaffective disorder, bipolar disorder, or depressive disorder (National Institute of Mental Health, 2016).

Intention to Follow Up

The definition of intention to follow up in this study is a cognitive plan to pursue follow up care for physical health risks. The operational definition of intention to follow up in care for health risks was measured by the one sentence question, "Rate your level of intention to follow up with an appointment in primary care to address physical health risks."

Chapter Two

Literature Review

Introduction

The status of medical care in those with SMI demonstrates premature mortality, excessive morbidity, and inequitable access and provision of care (Colton & Manderscheid, 2006; Lahti et al., 2012; Roshanaei-Moghaddam & Katon, 2009). Inequity of care creates difficulties in managing physical health problems in those with SMI. The focus of this review is to identify aspects of health risks that are germane to PMT and self-efficacy theory and that impact identification of physical health risks in the SMI through screening and follow-up care.

In the first section, the literature search strategy is described. The literature findings are reviewed regarding the lack of sufficient medical care and HRS in individuals with SMI, the purpose of and approaches used for HRS (with focus on HRS with SMI populations), and proposed approaches to improve HRS rates in individuals with SMI. Section two describes the PMT and the relationship between PMT components and study concepts. The relationship of HRS relative to PMT concepts of coping and threat appraisal and health protective behavioral intention and action are described.

Section three highlights the necessity of collaboration of care and consideration of PMT components of response costs (barriers) and intrinsic and extrinsic rewards (facilitators) for effective HRS in those with SMI. The literature identifies these as barriers and rewards. Focus is specifically on mental health impacts of follow-up care

and studies identifying the underlying process used for HRS interventions in individuals with SMI.

Section four includes review of clinical tools used to assess physical health risk and follow-up for those with SMI. The HIP is highlighted as a clinically useful HRS tool. The author's pilot study assessed feasibility of HRS with HIP in SMI in the United States is summarized in section five. In the concluding section, studies are summarized regarding approaches to maximize efficacy of HRS in individuals with SMI to improve intention to attend primary care follow-up appointments to reduce health consequences.

Literature Search

The search process focused on the following databases: *CINAHL, PsycINFO, EBSCO, and PubMed*. Psychiatric, psychological, social work, and behavioral science journals are included, in addition to nursing journals. Internet searches were used to elicit additional related research. Included were review/meta-analysis articles, original research studies, and qualitative studies (for barriers, facilitators). Not included were articles regarding children, geriatrics, and hospitalized, or individuals in residential placement. Focus was peer-reviewed articles published from 2008 to the present.

Searches included the following terms: *mental health, referral rates, primary care* (64 citations), and *seriously mentally ill*, *health risk screening,* and *mental health*. *Health screen effect* and *mental health clinic* yielded 26 citations and *health screen effects outpatient* yielded two citations. Research relevant to differential health care in those with SMI, the PMT, and self-efficacy were also searched. Articles relevant to the HIP were also included. Articles reviewed were those which aid in understanding of the

rationale and process of HRS in those with SMI as related to the PMT and components of the PMT of interest in this study.

Serious Mental Illness Defined in the Literature

Existing research did not always identify if the sample participants met criteria for SMI. This is partly because studies varied in how they define mental illness within their sample recruitments. The literature reviewed specifies if the population sampled met criteria of SMI. If the population was not clearly identified as SMI, the term *mentally ill* was used instead.

Section I. Differential Medical Care and Health Risk Screening for SMI

In this section, literature findings are reviewed regarding the lack of sufficient medical care and HRS in individuals with SMI and the purpose of and approaches used for HRS, with obvious focus on HRS with SMI populations. Also proposed approaches to improve HRS rates in individuals with SMI are described.

Significance of differential medical care in SMI.

Individuals with mental illness experience discrepant medical care. General ongoing health care, health risk screening, and preventative interventions are available to individuals with mental illness. Individuals with SMI receive and utilize health care at lower rates (Goodrich et al., 2013; Moore et al., 2015). Those with mental illness are given less respect by providers (Miller, Druss, Dombrowski, & Rosenheck, 2003) are referred less to specialty care (Buhagiar, Parsonage, Osborn, 2011), and are given fewer HRS's (Osborn et al., 2011), despite engaging in unhealthy lifestyles at higher rates than those without mental illness (Roshanaei-Moghaddam & Katon, 2009).

Additionally, individuals with mental illness are less satisfied with their medical care than the non-mentally ill (Kaufman, McDonnel, Cristofalo, & Ries, 2012) and receive less ongoing treatment for cardiovascular risk factors (Lahti et al., 2012). This is in part because the SMI population is stigmatized (Herrman, Trauer, & Warnock, 2002), marginalized, and seeks care primarily in mental health facilities (Kilbourne, Greenwald, Bauer, Charns, & Yano, 2012). These inequities may contribute to overall poorer physical health outcomes in SMI (Reilly et al., 2013). Unfortunately, there is negligible research about factors that improve equitable care and reduce mortality risks in mentally ill individuals (Vasudev & Martindale, 2010).

Those with SMI inequitably utilize ambulatory care. Some SMI individuals attend primary care at higher than average rates, however, 11% did not attend a primary care visit in 12 months (Planner, Gask, Reilly, 2014). Frequent attenders to primary care are the SMI with psychosomatic symptoms, at an odds ratio of 2.3 to 1 (Hauswaldt, Himmel, & Hummers-Pradier, 2013; Norton et al., 2012). Frequent attenders had associated low physical quality of life, low educational level, and diagnosis of severe substance abuse (Rifel et al., 2013).

Frequent attendance at primary care by those with SMI does not necessarily relate to improved monitoring of physical health needs. Non-treatment rates for medical co-morbidities in SMI are high, ranging from 30% for diabetes to 88% for hyperlipidemia (Nasrallah, 2006). There are also poor referral rates of clients in mental health care returning to primary care for routine medical follow-up (Wheeler, McKenna, & Madell, 2014). There are low rates of referral of these individuals to medical follow-up (Lahti et al., 2014). Individuals with SMI, also may neglect to follow

recommendations to attend follow-up at primary care (Planner et al., 2014). Studies do not definitively express the frequency of attendance at follow-up medical care.

Summary of Reasons for Reduced Engagement in Medical Care in SMI

Despite availability of health risk screening and preventative interventions for those with SMI, there is reduced rate of engagement in ongoing care (Moore et al., 2015). Factors of environment, stigma, and illness often interfere. Some individuals with SMI seek care at higher rates than those without SMI, yet screening rates remain low in this population. Care is sought primarily in mental health settings. There is limited research regarding the best ways to maximize medical screening and care in these settings. Engagement with primary health care in ongoing follow-up may be key to improving HRS rates and strengthening treatment for health risks.

Inadequate Health Risk Screening Rates in SMI

Numerous physical health parameters are found to be screened at lower rates in those with SMI. Screening rates are lower for physiological parameters and general health risk screening (Balf et al., 2008). For example, fewer cancer screening tests like mammography are offered to individuals with mental illness (Druss, Rosenheck, Desai, & Perlin, 2002). The SMI have lower rates of physiological screenings such as blood pressure (odds ratio of 0.68) and lipid testing (odds ratio of 0.58) than healthy controls (Roberts, Roalfe, Wilson, & Lester, 2007). The SMI are also significantly less likely to have blood sugar testing (Osborn et al., 2011), BMI calculation, and blood pressure screening (Kilbourne et al., 2011) than healthy control individuals.

Interventions targeting health risk in SMI improve rates of screening, but individuals with mental illness remain significantly less likely to be screened even after

adjustments for factors such as rural location and underserved health care setting (Osborn et al., 2011). Miller (2010) found that 99% of persons with SMI agree that metabolic monitoring is important and 80% view metabolic screening as favorable (Pitman et al., 2011). HRS done with awareness of barriers (response costs) and facilitating factors (rewards) has promise to help interventions be effective at reducing physical health risks (Hardy & Gray, 2012a; Wright, Osborn, Nazareth, & King, 2006).

There are insufficient HRS rates and poor medical outcomes in those with SMI. Low follow-up rates occur in those with mental illness once physical health risks are identified (Goodrich et al., 2013; Moore et al., 2015). Barriers exceed beneficial influences for pursuit of wellness behaviors such as HRS. Shor and Shalev (2013) explain that excess negative influences on healthy lifestyle behaviors are the main reason for low HRS rates in individuals with SMI. It is vital to clarify the feasibility of the most effective approaches to engage those with mental illness in physical HRS (Doherty & Gaughran, 2014) and to promote follow-up care for identified health risks (Happell et al., 2015; Vasudev & Martindale, 2010).

Summary of Findings of Low Health Risk Screening Rates in SMI

There are insufficient HRS rates and poor medical outcomes in those with SMI. Several areas are screened at lower rates in those without SMI, such as physiological parameters (blood pressure, lipid levels) and cancer risk. Low follow-up rates occur in those with mental illness once physical health risks are identified (Goodrich et al., 2013; Moore et al., 2015), often because barriers exceed beneficial influences for pursuit of wellness behaviors such as HRS. Shor and Shalev (2013) explain the excess of negative influences on healthy lifestyle behaviors are the main reason for low HRS rates in

individuals. It is vital to clarify feasible and effective approaches to engage those with mental illness in physical HRS (Doherty & Gaughran, 2014) and to promote follow-up care for identified health risks (Happell et al., 2015; Vasudev & Martindale, 2010). Ultimately, focus on reasons for inadequate HRS could improve rates of screening and opportunities for follow-up on physical health risks in SMI.

Physical Health Risk Screening in SMI

Preventative health screening rates have increased for those with SMI recently (Osborn, 2011) however, only 30% of individuals have been screened for physical health risks (Pitman et al., 2011). Individuals with SMI receive HRS of blood pressure, blood sugar, lipid profile (Osborn et al., 2011), and waist circumference at a lower rate than those without mental illness (Mitchell et al., 2012). Low percentages are screened for health risk (Dunbar et al., 2010) even when prescribed an antipsychotic and despite that 80% view health risk screening as favorable (Pitman et al., 2011). Baseline monitoring for physical health risks was five percent (Verdoux, Boulon, & Cougnard, 2008). In addition, women with SMI are screened at lower rates than men (Verdoux et al., 2008). Those with SMI receive lower quality of preventative care and fewer screenings than those without mental illness (Lord et al., 2010).

Despite improving awareness of excess physical health risks, the mortality rate in SMI increased at a faster rate than in healthy controls from 1994-2006 (Laursen, et al., 2014). However, findings differ regarding the amount of increased physical health risk, reasons for the elevated risk, and strategies for intervention (Cornell et al., 2010). There is agreement that early screening and intervention of physical health risks should be done

(Bartlem et al., 2014; Mackin, Bishop, & Watkinson, 2007; Reeves, Kaldeny, Lieberman, & Yyas, 2009).

HRS research in those with SMI has typically been done as chart audit, quality improvement, and/or protocol implementation. Quality improvement studies are numerous and focus on the health system and health provider's actions (Barnes et al., 2008; Castillo, Rosati, Williams, Pessin, & Lindy, 2015). Clinical chart audit has been studied to explore rates of physical health monitoring and encourage increased awareness of monitoring needs (Hardy, Hinks, & Gray, 2013; Gonzalez, Ahmed, & Fisher, 2010; Tratnack & Kane, 2010). Chart audits of interventions to increase physical health monitoring and screening in SMI resulted in a 24% improvement in health risk screening and monitoring (Gumber, Abbas, & Minajagi, 2010).

HRS tools are based on guidelines for health screening in those with mental illness. The guideline-driven approach (Koch & Scott, 2012; Mitchell at al., 2012; Yoemans et al., 2014) improves effectiveness and rates of HRS (Gibson, Carek, & Sullivan, 2011) and results in short-term increases in monitoring (Baller et al., 2015). There are numerous guidelines issued regarding recommended health risk screenings for those with SMI on high-risk anti-psychotic medication. Guidelines have been issued by the American Diabetic Association (Clark, 2004), the National Institute for Clinical Excellence (Yoemans et al., 2014, physical therapy organizations (Vancampfort et al., 2012), and cardiology groups (Hughes, & Dennison-Himmelfarb, 2011).

Regular physical activity is recommended in those with SMI by physical therapy consensus guidelines (Van Campfort et al., 2012). Nurses and providers in mental health care support the importance of lifestyle programs for individuals with mental illness

(Happell et al., 2013). To aid such lifestyle programs, mental health nurses should help ensure physical health checks and protocols are carried out routinely in individuals with SMI (Robson & Gray, 2007).

More recently, use of protocol/algorithm implementation was utilized to facilitate improved monitoring of physical health risks (Koch & Scott, 2012; Mitchell et al., 2012). Use of a monitoring protocol improved weight management and cholesterol levels in the short-term (Koch, & Scott, 2012) for individuals with SMI that were screened. Chart audit, quality improvement, and protocol implementation research can all result in limited or small reductions of health problems and limited or small ongoing beneficial effects (Dunbar et al., 2010; Baller et al., 2015).

There is a lack of randomized controlled studies showing significant and sustained benefit of physical HRS using any specific approach in those with SMI (Tosh et al., 2014). Interventions do temporarily increase screening and lower risk by improving cardio-metabolic parameters (Cabassa, Ezell, & Lewis-Fernandez, 2010; Fernandez-San-Martin et al., 2014; Vasudev & Martindale, 2010). Interventions using protocol recommendations for health risk screening in individuals with SMI improve rates of monitoring of metabolic risk factors (Barnes et al., 2008; Baller et al., 2015), in the short-term.

Screening guidelines disagree about when and what physical health risks should be including. However, there is agreement that HRS of individuals with mental illness should be completed and that mental health professionals should ensure that physical health checks are carried out (Robson & Gray, 2007). There are no completed

randomized studies showing any harmful effects related to health risk screening in the population of individuals with SMI.

There is an increase in studies that identify and quantify physical health risk occurrence rates in those with mental illness, but there is negligible research about specific approaches that improve physical HRS implementation (Happell et al., 2015; Vasudev & Martindale, 2010). HRS is a tool that may improve outcomes by increasing awareness and perception of physical health risks and encouraging both intention to act and protection motivation as outlined in the PMT. Additionally, intention to act potentially leads to increased or improved follow-up levels with primary medical care providers.

Summary of Research of Physical Health Risk Screening in SMI

Research had begun to address inadequate HRS rates in those with SMI, however effective approaches are negligibly researched. Lack of awareness of health recommendations, lack of effective approaches, and low HRS rates demarcate the necessity for research to clarify acceptable, feasible, efficient approaches to engage individuals with SMI in physical HRS (Doherty & Gaughran, 2014). Use of guidelines, algorithms, and structure in designing HRS could improve reproducibility (Mitchell et al., 2012). Structured HRS administered by mental health professionals, mental health workers, and nurses with recommendations for follow-up could encourage those with SMI to get screened and follow-up on identified health risks (Bressington et al, 2016; Brunero & Lamont, 2012). Improved follow-up with primary care providers on identified physical health risks can reduce morbidity and mortality of individuals with

SMI, especially if the interventions are based in community and ambulatory settings. (March et al., 2015).

Health Risk Screening Interventions in SMI

Interventions designed to improve screening and promote treatments that reduce physical health and cardio-metabolic risk in the SMI population often utilize a metabolic nurse (Happell et al., 2013), case manager, or medical professional. These interventions are often opportunistic instead of formally arranged (Holt & Peveler, 2010) and involve investing additional time to better engage client action regarding identified physical health risks (Cabassa et al., 2010; Dunbar et al., 2010).

Most interventions target staff and provider education to increase adherence to protocols and to improve monitoring rates. Protocol-driven interventions result in short term improvement in monitoring rates. Improvement in health risk monitoring was found with an algorithmic approach for health risk parameter data collection following National Institute for Health Care Excellence guidelines (Yoemans et al., 2014). In addition, many of these interventions required large resource outlay for staff (nurses, mental health providers) to provide reminders and screenings to assess and reinforce proper monitoring protocols for SMI individuals prescribed atypical antipsychotic medication (Farrand, Confue, Byng, & Shaw, 2009; Happell et al., 2013).

HRS involves three aspects: assessment, brief advice, and referral/follow-up (Bartlem et al., 2014). Most HRS research has focused on interventions to improve health risk assessment rates and early intervention of metabolic abnormalities in individuals taking long-term anti-psychotic medications for their mental health symptoms (Barnes et al., 2013; Gothefors, et al., 2010; Greer & Hill, 2011). Research

regarding HRS in those with SMI focuses primarily on assessment processes with limited measurement of health outcomes. Some short-term interventions have targeted provider education to increase adherence to monitoring protocols. However, these interventions often require large resource outlay to provide reminders to medical professionals to increase rates of HRS in individuals with SMI (Happell et al., 2013).

HRS for individuals with SMI often utilizes a metabolic nurse (Happell et al., 2013), is opportunistic instead of formal (Holt & Peveler, 2010), and uses substantial time and effort to engage client action regarding identified health risks (Cabassa et al., 2010; Dunbar et al., 2010). Nurses educated regarding physical health risk in those with SMI were likely to encourage (Hardy et al., 2013) and improve the physical HRS process (Maki & Bjorklund, 2013).

Collaboration between care providers and guideline-driven, algorithmic or protocol approach (Yoemans et al., 2014) improves effectiveness and rates of HRS (Gibson et al., 2011). Primary care and secondary care (mental health) collaboration has been used successfully to develop a plan for healthy lifestyle habits for those with SMI (Gibson et al., 2011).

Summary of the Challenges of Health Risk Screening in SMI

Interventions using HRS focus on chart audit for quality improvement, algorithm, or consensus guideline with limited sustained benefits in HRS rates or health outcomes (McGinty et al., 2015). These HRS interventions are, often opportunistic instead of formally arranged (Holt & Peveler, 2010) and focus on one health risk area limiting their impact (Bartels et al., 2013; Casagrande et al., 2011; Vandelanotte, Spathones, Eakins, & Owens, 2007; Vazin et al., 2016). Numerous barriers hinder the completion of HRS and

limit individuals with SMI from action regarding identified physical health risks (Ronsley et al., 2011). HRS effectiveness can be improved by optimizing nurse involvement and encouraging collaboration between mental health and primary care providers. Effective health risk interventions target multiple physical health risks (Fernandez-San-Martin et al., 2014; Prochaska, Spring, & Nigg, 2008), address barriers to health promotion or protective behaviors (Ronsley et al., 2011), and are time and cost effective (Stanton et al., 2016).

Need for Future Research Identified by Literature Review

The numerous and substantial barriers to HRS must be targeted with interventional strategies to eradicate excess morbidity and mortality rates. Highly effective HRS would address response costs (barriers) and problems with transportation, lack of individualized interaction (De Hert et al., 2011), lack of collaboration of care (Ehrlich et al., 2013), and difficulty recruiting participants for time-consuming health risk screenings. The current study addresses barriers using written invitations to participate, face-to-face interview sessions, brief discussion of follow-up recommendations, and compensation for the individual's time to participate in the screening.

Study is needed to clarify the role of coping appraisal and engagement in follow-up to target identified risks once an individual with SMI has undergone HRS. Effectiveness of HRS can be maximized by targeting cognitive appraisal of perceived risk, and follow-up action or protection motivation. The current study has individuals complete paper-and pencil questionnaires regarding perceived risk and self-efficacy for health improving the individuals' awareness of these factors. Targeting of barriers and

facilitators has had limited application in previous HRS interventions with individuals with SMI. Addressing barriers, using one-on-one interviews, transportation assistance, and financial reimbursement for time required for the HRS as the present study does, can also improve physical HRS effectiveness and facilitate intention to follow-up in ongoing care.

Section II. Conceptual Framework-Protection Motivation Theory

Section two describes the PMT and the relationship between PMT components and study concepts. The relationship of HRS relative to PMT concepts of coping and threat appraisal and health protective behavioral intention and action are analyzed.

The PMT model is adapted from Rogers (Milne et al., 2000). Formulated by Rogers (1975), the PMT proposes that there are two main types of cognitive appraisal of risk: threat appraisal and coping appraisal. Threat appraisal includes perceived severity, vulnerability (perceived risk), and rewards (facilitators) of specific behaviors (Floyd et al., 2000; Plotnikoff & Higginbotham, 2002; Rogers, 1975). Coping appraisal includes self-efficacy, response efficacy or how much benefit the response will generate, and ability to overcome barriers (response costs) (Ch'ng & Glendon, 2014). The PMT identifies cognitive appraisal of risk as the main influence that precedes adaptive or maladaptive coping: it also drives the eventual intention to change behavior and actual change in behavior to reduce health risk (Rogers, 1975).

Both threat appraisal and coping appraisal have potential to mediate health protective behaviors, identified in PMT as protection motivation. Protection motivation, does not include consideration of specific motivational aspects of behavior, thus motivation is not specifically addressed in the literature review, development, or

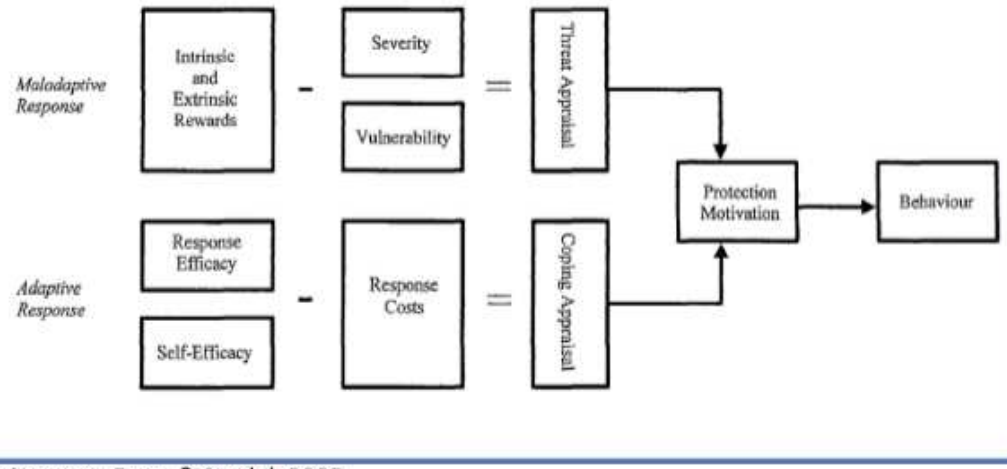
implementation of the HRS process in this study. Protection motivation as used in PMT is a factor that arouses, sustains, and directs action to protect the individual from danger or risk (Ch'ng & Glendon, 2014) of health consequences. Protection motivation is also identified in the literature as intention to act. Protection motivation follows threat appraisal or adaptive coping appraisal after influence of negative cognitive components such as perceived consequences (risk) and response cost components (see Figure 1).

Furthermore, various and complex sources of information influence risk appraisal. Such, various information sources are hypothesized to influence the cognitive processes of threat and coping appraisal the individual develops before acting. The antecedents of cognitive appraisal are previous environmental aspects like observational learning and interpersonal personality aspects (Floyd et al., 2000). An example of information sources that influence cognitive risk appraisal would be an individual who has relatives that die at young ages of heart related problems despite having had cardiac care. The experience of the relative dying despite care influences the individual to choose to engage in protection motivation of the maladaptive type and forgo screening for heart problems. This individual would likely use avoidance and elect not to get lipid screening to repress exposure to negative emotions regarding cardiac risk.

Cognitive appraisal of risk is proposed to be evaluated as maladaptive (threat) or adaptive (coping) appraisal in PMT. Threat appraisal is based on cognitive aspects that can engender fear, such as severity and vulnerability evaluation and results in differing intentions and eventual behaviors depending upon the nature of the health risk message. In fact, if the message results in enacting of drive or intentions, the threat fosters trial and

error of behaviors to counteract the health threat. However, if the message evokes fear, behavioral actions will target reduction of the unpleasant emotions (see Figure 1).

Figure 1.
Summary of PMT perspective of cognitive processes that influence risk appraisal and protection motivation (intention to act) and eventual behavioral action



Note: From Norman, Boer, & Seydel, 2005

Figure 1. PMT Cognitive Processes

The more severe the threat is perceived, the more likely either an adaptive or maladaptive behavioral response will occur (Floyd et al., 2000). Furthermore, individuals evaluate perceived threat of health consequences on a cost versus benefit basis subjectively (Floyd et al., 2000). When risk is perceived as severe it may prompt defensive or maladaptive responses (Ruiter, Kessels, Peters, & Kok, 2014). Risk that is realistically presented may be less likely to elicit maladaptive coping (Tulloch et al., 2009). This unpredictable effect of fear in motivating either adaptive positive behaviors

or maladaptive behaviors complicates the study of behavioral outcomes regarding health risks.

If the message includes reassurance of reduced risk related to a behavior or action, that action will likely be followed and acted upon to reduce the negative emotions (Boer & Seydel, 1996). Extrinsic rewards (facilitators) are actions that are believed to reduce negative consequences of health risks (See Figure 2). Effectiveness of advised behavior, termed response efficacy, also enhances the adoption of behavior changes (Floyd et al., 2000). For example, study has shown that those who perceived colon cancer as severe and that exercise would reduce their risk of developing colon cancer were more motivated to exercise (Courneya & Hellsten, 2001). An application of risk appeal aspects of the PMT would be if a diabetic individual perceived high blood sugars as leading to severe consequences, the perceived risks would lead to higher intentions to change their eating to reduce blood sugars (Plotnikoff et al., 2010).

The PMT can be used in interpretation of features and subcomponents of coping and threat appraisal and relationship with action regarding health risks. The PMT highlights effects of cognitive appraisal including rewards (facilitators), vulnerability (perceived risk), response efficacy, and self-efficacy. These cognitive appraisal components are all important in evaluating efficacy of the health risk screening process and studying the relationship between these components and follow-up for health risks. The concepts of PMT identified as most salient to HRS in individuals with SMI are linked to the measurements planned in this study which include perceived risk (risk appraisal) and self-efficacy for health behaviors. Further description of the measurement approaches is given in chapter 3.

Findings of Protection Motivation Theory as used in Health Risk Prevention

The two main cognitive processes of focus in PMT, threat or risk appraisal and coping appraisal are hypothesized to predict intention to act (protection motivation) and action to protect health. There is stronger support for the predictive ability of coping appraisal, which includes self-efficacy components, than for the vulnerability and threat appraisal components of PMT (Milne et al., 2000; Plotnikoff et al., 2010). PMT, like other cognitive health promotion models, was found in a meta-analytic review to be not very effective at predicting future health behaviors, either months or years later (Milne et al., 2000).

Studies have been done to identify whether intent to change behaviors that will reduce health risks are related to PMT or components of PMT (Floyd et al., 2000). Many of the findings linked threat appraisal and coping appraisal to intentions to act (Chambers et al., 2016; Ch'ng & Glendon, 2014; Ruiter et al., 2014). The latest portions of the PMT model is least developed and identifies protection motivation as preceding and leading to action or behavior to reduce risk. Since the stages and processes that occur in the final portions of the model are not identified, this study will not focus on those aspects. The outcome of focus of the study is protection motivation (intention to act).

Previous research related to PMT has focused primarily on cardiovascular risks such as low exercise rates (Bassett & Ginis, 2011; Plotnikoff et al., 2011; Tulloch et al., 2009). Research using the PMT has usually only studied one health risk per study: however, some studies have included multiple health risk factors and related them to PMT (Ho et al., 2015; Sakhvidi et al., 2015). HRS often identifies multiple health risks.

There is limited study regarding integration of multiple risk factors as targets of interventions. Findings relating PMT to intention to act and change in behavior follow.

Intention to act (protection motivation) has a relationship with health protection behaviors or intent to reduce health risks in a broad range of health risk areas. Protection motivation explained a significant portion (59-63%) of the variance (Cox, Koster, & Russel, 2004) of intention to consume health food and is significantly correlated (r=0.45) with sunscreen as a protective health behavior (Ch'ng & Glendon, 2014). PMT components when related to physical activity interventions, explained 53% of the variance in intention to exercise (Norman, Boer, & Seydel, 2005). Health risk is impacted by protection motivation. Protection motivation or intent to act has a mediating effect on likelihood to act regarding health risks (Ch'ng & Glendon, 2014).

Study using PMT has typically related intention to act or protection motivation with a specific risk area and not studied actions taken to reduce health risk. However, a few studies have measured actual health protection behaviors. Exercise study has linked PMT with actual exercise behaviors. The combined influence of measures of response efficacy, severity, vulnerability, and self-efficacy in the PMT explained significant portions of the variance (46%) in exercise behaviors in community dwelling adults (Plotnikoff & Higginbotham, 2002). Exercise behavior was moderately correlated with PMT components in the short-term, but not the long-term (12-months) in a group (N=787) of coronary artery disease sufferers (Tulloch et al., 2009). No effect sizes were calculated in either of these studies of PMT relationships to exercise behaviors. Both vulnerability and severity of cardiovascular illness were noted to have a positive linear relationship with exercise behavior. Also, response efficacy, likelihood of reduced risk

by performing the behavior, was significantly related to improved short-term exercise behaviors. Meanwhile, self-efficacy was statistically significant in the full model of PMT components, but was not statistically significant at 12-months in relation to actual exercise rates in a structural equation model (Tulloch et al., 2009).

Research applications of the PMT in behavioral setting with individuals with SMI are limited. Researchers have applied PMT to study health behaviors in individuals with schizophrenia (Leas & McCabe, 2007) and to assess self-efficacy effects related to social participation (Suzuki, Amagai, Shibata, & Tsai, 2011). For example, individuals with mental illness who were employed were found to have higher level of self-efficacy than those who were not employed (Suzuki et al., 2011). Psychiatric symptoms and social support are noted to influence intention to follow health protective behavior in those with schizophrenia (Aschbrenner, Mueser, Bartels, & Pratt, 2013). Rewards to maintain a risky health behavior such as substance use in SMI were reviewed. Findings noted reduced reward for substance use when external incentives were offered. When cash valued items were offered to those with SMI, they showed improving intention to act to protect health (Tidey, 2012).

Application Protection Motivation Theory to Health Risk Screening

Interventions guided by the PMT were found to explain the relationship of health risk related to intention to act in numerous health areas. The health areas PMT interventions target include; cardiovascular risk (Sarkar, Ali, & Whooley, 2007; Tulloch et al., 2009), exercise (Bassett & Ginis, 2011; Plotnikoff et al., 2011), and dietary fat and weight management (Cox et al., 2004; Ho et al., 2010; Wilson et al., 2016). Additionally, areas of health risk such as cancer and sexual health were studied related to

PMT. Efforts have been made to apply the PMT to improve understanding of sexual risk behaviors (Chambers et al., 2016) and cancer risk and health promotion and prevention behaviors (Ch'ng & Glendon, 2014; Courneya & Hellsten, 2001).

Substance use was identified as an aspect of health behavior that can be predicted to some degree by PMT. Use of alcohol or abstinence from alcohol was found to relate to PMT components (Glozah et al., 2015; Murgraff, White, Phillips, 1999; Runge, Prentice-Dunn, & Scogin, 1993) as were smoking behaviors (Leas & McCabe, 2007; Sterling, Ford, Park, & McAlister, 2014; Yan et al., 2014). Intentions related to alcohol use were found to be predicted by perceived severity and self-efficacy components of PMT, but the actual act of using alcohol was not found to significantly correlate to any of the PMT components measured (Murgraff et al., 1999).

Summary of Findings of Protection Motivation Theory and Risk Prevention

Health risks have been studied in relation to PMT and cognitive appraisal factors. Usually one health risk is studied at a time, but at times, multiple risks are assessed and related to PMT, as in the current study. Coping appraisal is a stronger predictor than threat appraisal of both intentions to act and actual actions. Intention to act was shown to relate to PMT components in the setting of numerous different health risks studied as described above, such as exercise, diet and weight management, sexual behaviors, alcohol use, smoking, and cancer.

There are limited findings relating PMT theory components to health behaviors in individuals with serious mental illness. Intention to act strongly predicts actions to protect health and reduce health risks in populations without mental illness in the short-

term. Effects on behavior and intention to act of the PMT components after one year are less predictable.

Separate components of the PMT are discussed in this next section. Literature findings regarding the PMT components of threat appraisal and coping appraisal (including self-efficacy) are reviewed. The focus of this review of PMT literature is on how the PMT components relate to intent to act and actions regarding physical health risks.

Threat Appraisal and Protection Motivation Theory

Threat appraisal has a variable effect on both intent to act (protection motivation) and action to lower health risk (health protective behaviors). Neuwirth, Dunwoody, and Griffin (2000) found that perceived threat or perceived risk of vulnerability of health consequences, even when self-efficacy is low, can relate to increased motivation to act or protection motivation. However, sometimes increases in perceived threat or perception of the risk of vulnerability to health consequences along with low self-efficacy can reduce intent to act (Courneya & Hellsten, 2001). High self-efficacy and high perceived threat of medical illness (physical health risk) more predictably relate to increased intention to act than high perceived threat of medical illness and low self-efficacy does (Ch'ng & Glendon, 20014).

Coping Appraisal and Protection Motivation Theory

Response efficacy is the perceived likelihood that an action will reduce health risk. Response efficacy and self-efficacy, both coping appraisal contributors, have more effect on health protection actions than threat or vulnerability and severity appraisal components (Milne et al., 2000). For example, PMT components of perceived health

risk and predicted response efficacy of taking action contribute to health protective action. Perceived response efficacy or belief that it would be beneficial to use sun protection (Ch'ng & Glendon, 2012) predicted protection motivation (intention to act) to reduce risks of sun exposure. Response efficacy or the belief that exercise would be beneficial also significantly predicts intentions to exercise (protection motivation). Coping appraisal components accounted for approximately 20% of the variance in exercise intention and exercise behavior when components of the PMT were measured (Tulloch et al., 2009).

Self-efficacy and Health Risk Screening in Serious Mental Illness

Self-efficacy is noted to have the most significant effect of all the components of the PMT on intention (protection motivation) to act and actual health protective behaviors (Bui et al., 2013; Plotnikoff & Higginbotham, 2002). However, self-efficacy for one task may not predict self-efficacy for another (Bandura, 2004; Jones, Ringer, & Kang, 2007). Thus, it is preferred to measure self-efficacy for the specific behavior targeted in the intervention (Marks, Allegrante, & Lorig, 2005). This study will measure self-efficacy for health as a specific measure of individuals' beliefs about ability or efficacy to make health behavior changes.

Self-efficacy in those with SMI

There is a relationship between low self-efficacy and sedentary life style (Van Campfort et al., 2010). Self-efficacy is a possible mediating variable in the relationship between physical HRS and intent to act (protection motivation) and taking behavioral action to reduce health risk. Since self-efficacy is situation specific it is important to measure self-efficacy for health in study of HRS in individuals with SMI. Previous

study is minimal, that measures or identifies self-efficacy for health relationship to improved health protective behaviors in individuals with SMI.

Self-efficacy was also found to relate to other demographic factors including gender, marital status, and level of education (Morowatisharifabad, Ghofranipour, heidarnia, Babaee, & ehraMpoush, 2006). In addition, self-efficacy was found to be useful to quantify intent to act to improve health, such as to reduce smoking (Sterling et al., 2014). Self-efficacy for physical activity, self-efficacy for healthful eating, and self-efficacy for weight lost also was found to predict outcome behaviors in weight interventions (Wilson et al., 2015), cardiovascular symptomatic outcomes (Sarkar et al., 2007) and cancer prevention interventions (Sakhvidi et al., 2015).

Self-Efficacy Measurement Tools

Self-efficacy influences health promotion (Morowatisharifabad et al., 2006), mediates behavioral intention and action, and relates to outcomes (Riemsma, 1998). General self-efficacy has been studied and found to relate also to outcome expectancies, self-regulation of health behaviors, well-being, and coping strategies (Luscyscinzki et al., 2005). Thus, quantifying the influence of self-efficacy in health risk research is vital. General self-efficacy relates to other psychological concepts. The General Self-Efficacy scale (GSES), which measures general self-efficacy, was found to have relationships with perceived self-efficacy, intentions to act, and outcome expectancies (Schwarzer, 2014). Self-efficacy is a main component of the organizing framework, PMT, and further highlights the utility of quantifying self-efficacy.

There are several possible tools available to measure self-efficacy for health promotion or health risk reduction (see Appendix A). These three tools which measure

self-efficacy for health are the Self-efficacy for Health (SEH) tool (Gandoy-Crego et al., 2016), the Self-Rated Abilities for Health Practices (SRAHP) tool (Becker et al., 1993) and the Health Promoting Lifestyle Profile (HPLP) tool (Walker, Sechrist, & Pender, 1987). The SRAHP will be used in the current study.

The SRAHP tool is well suited to HRS in individuals with SMI as it includes consideration of self-efficacy for psychological well-being and general self-efficacy for health. The HPLP scale targets only a limited number of specific health behaviors such as exercise, nutrition, and smoking (Gohner, Dietsche, Fuchs, 2015; Sheer, 2014; Sterling et al., 2014; Wilson et al., 2016). The SEH measures general self-efficacy, thus is not specific to self-efficacy for health, which is the type of self-efficacy acting on protection motivation in relation to health risks identification and intention to act to reduce health risks.

Summary of Self-Efficacy in PMT used in Health Risk Screening

Self-efficacy has been found to be useful in quantifying intention to act to improve health and in predicting health outcome behaviors. Self-efficacy and response efficacy, coping appraisal subcomponents of the PMT, have strong influence on intention to act and action to protect health. To evaluate HRS in the context of PMT, self-efficacy must be able to be measured. Self-efficacy for health can be measured specifically and as a general concept. The SRAHP measures self-efficacy for specific health behaviors. General self-efficacy for health (GSES) relates to positive well-being and coping (Luscyscinzki et al., 2005) which may foster physical health behaviors such as pursuit and completion of HRS.

Measurement of self-efficacy for specific health behaviors can be accomplished via the SRAHP scale. Self-efficacy effects are best quantified by measuring self-efficacy specific to the health behavior being studied (Bandura, 1977). Measuring self-efficacy for health is pivotal to understanding health behavior from the PMT perspective and in studying HRS's relationship to intention to act to reduce health risk. Thus, the SRAHP tool, an instrument that measures self-efficacy for health behaviors was chosen to measure self-efficacy specific to health in this study.

Summary of PMT application to HRS

The HRS process facilitates risk vulnerability and severity awareness (perception) and can improve protection motivation (intention to act) and encourage eventual action to reduce health risks. Coping appraisal includes effects of self-efficacy and response efficacy and considers the negative impact of response cost (barriers) which later results in the decisional balance outcome or protection motivation to act (Leas & McCabe, 2007).

Previous research using the PMT to study health focused on cardiovascular risks and exercise. There is limited research using PMT and individuals with SMI (Leas & McCabe, 2007). There is also minimal research that has used screening for multiple health risks in a single study. Evaluating multiple health risks with a single screening, the HIP, would be a clinically efficient and practical way to encourage HRS for individuals who have SMI.

Section III- Application of Rewards and Response Costs within PMT

HRS in individuals with SMI will be most effective if aspects of HRS process can be improved. HRS, guided by PMT, has potential to improve the HRS screening

process and improve HRS rates. The barriers and facilitators to health promotion interventions is a large body of research that relates concepts of PMT to HRS. PMT, when used to guide HRS, includes consideration of intrinsic and extrinsic rewards (see Figure 2) which are partially explained by facilitators of health promotion and health risk screening. Self-efficacy and response efficacy as promoting factors and response cost as a limiting factor must be considered in the coping appraisal process for physical HRS to be maximally effective.

Intrinsic and extrinsic rewards (facilitators of HRS), including personal and environmental, are reviewed next. In the PMT model, facilitators equate with environmental and personal sources of information (intrinsic and extrinsic rewards) that occur early in the coping or threat appraisal process (see Figure 1). Barriers fit into the PMT model as costs of response. The differential influence of these information sources depends on the individual's cognitive appraisal of them, thus complicating study of HRS in the SMI.

Barriers (response costs) to medical care and preventative screening for clients with SMI are still poorly understood (Owens, Crone, Kilgour, & El Ansari, 2010). More barriers (response costs) to physical health care and health screening than facilitators (rewards) have been identified in research (McKibbin, Kitchen, Wykes, & Lee, 2014; Roberts & Bailey, 2011; Shor & Shalev, 2013). Interventions increase screening rates and lower cardio-metabolic risks in those with mental illness (Cabassa et al., 2010; Fernandez-San-Martin et al., 2014). Ultimately, barriers (response costs) and facilitators (rewards) to health promotion in individuals with SMI must be addressed for

physical HRS to be maximally effective (McKibbin et al., 2014). Future interventions should target response costs and rewards.

Facilitators (rewards) and Barriers (response costs) regarding healthy lifestyle in SMI.

Attention to facilitators (rewards) and barriers (response costs) of HRS (Beebe et al., 2005) and inclusion of recommendations for follow-up care can foster improvements in healthy lifestyle behaviors and reduction of health consequences. Facilitators of lifestyle changes include intrinsic and extrinsic. Intrinsic facilitators are personal factors, emotional aspects, and personal attributes, such as self-efficacy. Extrinsic rewards include environmental supports, such as self-efficacy (Roberts & Bailey, 2011). Barriers (response costs) can be personal, cognitive, and health care environment. These barriers and facilitators are described as related to HRS promotion processes.

Facilitators (rewards) of HRS in those with SMI

Personal facilitators to lifestyle changes include individualized programs (Happell et al., 2014), one-on-one reinforcement (McKibbin et al., 2014), and incentives for participation (McKibbin, et al., 2014). Peer support is another facilitator (Ashbrenner et al., 2013; Bergqvist, Karlsson, Foldemo, Wardig, & Hultsjo, 2013). Individuals participating in wellness programs experience symptom reduction which is a factor promoting positive lifestyle changes (Roberts & Bailey, 2011). Personal supports of lifestyle changes also include education and personal attributes, such as self-efficacy (Roberts & Bailey, 2011).

Emotional supports for HRS and healthy lifestyle include identification and reduction of mental illness symptoms (Beebe at al., 2005; Roberts & Bailey, 2011),

verbal praise, and reinforcement of potential benefits (Aschbrenner et al., 2013). Medical appointment follow-up attendance is improved by small clinic or care setting, relaxed waiting area, and short wait times (Miller, 2010).

Environmental supports (extrinsic rewards) for HRS and healthy lifestyle behaviors are collaboration of care, transportation assistance (Ashbrenner et al., 2013; Castillo et al., 2015; Pearsall, Hughes, Geddes, & Pelosi, 2014) and childcare assistance (Hodgson, McCulloch, & Fox, 2011). Social supports are emotional, practical, and mutual and facilitate health behavior monitoring and change (Aschbrenner et al., 2013). Many environmental supportive factors are considered in the PMT as antecedents to coping or threat appraisal and eventual behaviors.

Facilitative factors (rewards) are varied and minimally quantified regarding which have the most powerful influence on HRS. Personal factors, personality attributes, environmental supports, and illness factors are all vital to consider in evaluating HRS approaches for individuals with SMI.

Barriers (response costs) of HRS in SMI

Personal barriers (response costs) to health risk monitoring can reduce action and are related to increased response cost. Personal barriers primarily include factors related to chronic mental illness. Personal illness barriers include anti-psychotic medication, treatment effects, side effects of medications (Roberts & Bailey, 2013; Shor & Shalev, 2013), recurrent hospitalizations (Verhaege, De Maeseneer, Maes, Van Heeringen, & Annemans, 2013), and comorbid health problems (Shor & Salev, 2013). Personal barriers can also include cognitive limitations (Roberts & Bailey, 2010), poor energy level and motivation (Verhaeghe et al., 2013), and periods of relapse of symptoms

(McDevitt, Snyder, Miller, & Wilbur, 2006; Shor & Shalev, 2013). Other personal barriers identified are tendency to have an external locus of control, limited initiative to seek physical health screenings (Buhagiar et al., 2011) and limited self-efficacy or confidence in ability to complete screenings (Ronsley et al., 2011).

Additional barriers (response costs) to physical health in mentally ill are lack of knowledge about health risk, negative lifestyle habits of family, and adverse peer influences (McKibbin et al., 2014). Lack of supportive companionship for healthy lifestyle is a commonly reported barrier (Shor & Shavel, 2013). Social barriers also include stigma (McKibbin et al., 2014), negative staff attitudes, and peers with sedentary and unhealthy lifestyles (Ashbrenner et al., 2013; Roberts & Bailey, 2011).

Barriers (response costs) have stronger impact than facilitators (rewards) on preventative screening and healthy lifestyle behaviors in clients with SMI (McKibbin et al., 2014). The strength of impact of barriers and facilitators remains poorly understood. Common barriers to healthy behaviors and HRS are personal illness symptoms, stigma, and limited environmental support. Addressing these barriers could limit their negative effect and foster engagement in HRS by those with SMI.

Health Care System Barriers (Response Costs) for Physical HRS

Organizational barriers to health risk assessment and health change include lack of organizational support and transportation problems (Coblentz et al., 2015; Shor & Shalev, 2013). For those in residential facilities barriers include inability to control environment and negative staff attitudes (Roberts & Bailey, 2011). Research targeting barriers has focused on interventions to improve monitoring rates, prevention, and early intervention of metabolic abnormalities in SMI patients (Barnes et al., 2008; Gothefors,

et al., 2010; Greer & Hill, 2011). HRS with recommendations, which help individuals identify vulnerability and severity of risk for health consequences could potentially improve coordination of care and HRS prevalence for individuals with SMI. Use of the PMT to identify these components of rewards and response costs can help maximize the HRS process.

Summary, Facilitators (Rewards) and Barriers (Response Costs) of HRS in SMI

Personal illness barriers are significant. Additional barriers identified include a tendency for an external locus of control, restricted initiative (Buhagiar et al., 2011), limited knowledge of potential health risks, and limited self-efficacy or confidence in ability to seek HRS and follow-up (Ronsley et al., 2011). Social environmental factors that limit HRS are peers with unhealthy lifestyles, stigma, and lack of positive peer and professional influences. Facilitating factors for HRS have been found to be less abundant in SMI. Personal, environmental, and emotional aspects can help facilitate HRS.

There is limited understanding of which factors have the most positive impact on HRS rates (Miller, Druss, Rohrbaugh, 2003). Many interventions have targeted monitoring protocols which require substantial amounts of resources. This study targets facilitators, such as personal factors which can be influenced using limited resources. Personal facilitators are specifically targeted by individualized one-on-one HRS interviews (McKibbin et al., 2014), incentives (McKibbin, et al., 2014), and transportation assistance.

The PMT component that aligns with HRS is the cognitive evaluation of threat perception. The area of threat perception appraisal HRS impacts is the evaluation of severity and vulnerability of risk for health consequences. Threat appraisal has less impact on cognitive processes that promote protection motivation in previous research, this may be because threats often appeal to emotional processes instead of cognitive ones. If the threat can be quantified and re-assessed from a perspective of information of response efficacy and other cognitive aspects the likelihood of coping (adaptive) appraisal and intention to act are higher (Dehoog & Stroebe, & Dewitt, 2007). The HIP risk screening, which included counseling regarding actions to reduce risk encourages cognitive re-assessing of threat (vulnerability).

The PMT provides a well-organized basis to analyze the cognitive processes that underlie HRS and intention to act on health risks. The process of HRS, however is complex limiting its application in current clinical practice (Dunbar et al., 2010, Stanton, Platania-Phung, Gaskin, & Happell, 2016). The next section describes the lack of organized approaches to access individuals with SMI for HRS (insufficient medical care), low HRS rates, poor understanding of best practice processes to facilitate HRS, and lack of follow-up once HRS occurs (Hughes & Dennison-Himmelfarb, 2011).

Section IV - Physical Health Risk Screening Tools used in SMI

There are several available tools which assess physical health risks in individuals with SMI. There are general HRS tools and tools that are specifically designed to be used in those with SMI to assess physical health risk (Millar, 2010). Tools designed specifically to assess physical health risks in those with SMI are the focus of this section, particularly the HIP (Serious Mental Illness Health Improvement Profile).

Informal assessment of health risks in those with SMI.

There are no tools for assessment of health risk in those with SMI that have been used as a standard of care (Babor, Sciamanna, & Pronk, 2004). Protocol use to determine health risks in those with chronic mental illness is a diverse topic. Use of a protocol only (without any additional intervention) has resulted in short-term improvements in rates of HRS, but long-term effects and most effective aspects of interventions have limited study (van Hasselt et al., 2013). Preliminary information about the formal health risk assessment tools that have been used with SMI individuals to quantify physical health risks is described next.

Formal health risk screening instruments for those with SMI.

There are several tools, in addition to the HIP, that have been used to assess physical health risk in those with mental illness (see Appendix B). Blomstrand, Lindqvist, Carlsson, Petersen, & Bengtsson (2005) measured general health aspects by patient report and included vital signs and waist circumference. This tool was semi-structured and did not include a component of recommendations for follow-up. It was clinically tested, but not empirically studied.

Brunero and Lamont (2009) studied a tool focusing more on metabolic aspects of health risk, the Metabolic Syndrome Screening Tool (MSST). The MSST is a protocol-driven monitoring approach and has similar limitations. The physical health check (PHC) is another informal tool which was piloted to assess physical health risks in those with mental illness (Phelen et al., 2004). The PHC was acceptable to individuals with mental illness and assisted mentally ill clients and health care workers to agree on goals

related to physical health risks identified. The PHC is less specific than the HIP and is less studied (Phelen et al., 2004).

The HIP was used primarily to quantify health risks and establish rates of specific health risks in individuals with SMI, such as metabolic syndrome, elevated BMI, waist circumference, and other health risk indicators (Bressington et al., 2014). The HIP was studied in primary care and was administered by primary care nurses in clinical settings (Hardy & Gray, 2012a). Yearly use of the HIP tool is recommended to monitor and evaluate physical health risks in individuals with SMI as recommended by the National Institute for Health and Care Excellence (NICE) European guidelines for monitoring physical health of those with schizophrenia and SMI (NICE, 2016). The HIP tool thus, is recommended to be repeated yearly to monitor physical health risks in persons with SMI as ongoing monitoring.

Routine HRS in those with SMI is recommended by national agencies as a practice guideline for quality care and can reduce physical health risks. A structured HRS, such as the HIP, can be used to screen and provide recommendations for follow-up care to those with SMI. When compared to other practice-based tools, the HIP has better validity testing, is research based, and assesses a broader range of physical health risks than comparable assessment tools (Bressington et al., 2016; Brunero & Lamont, 2009; Dunbar et al., 2010). The HIP is administered in a one-on-one interview that is patient focused and has been shown to be valid for use in those with SMI (White et al., 2012). Further study is needed regarding the feasibility and acceptability of the HIP for screening and referral to primary care individuals with SMI cross-culturally.

Awareness of physical health risks and planned follow-up.

There is a paucity of research regarding prevalence of awareness (perception) of physical health risk or planned follow-up of health risk in individuals with SMI. This study seeks to increase understanding of factors related to awareness of physical health risk. Much of the study regarding health risk in the SMI population has focused on identifying both facilitating and hindering factors for health risk screening. Screening rates have remained below those in populations without mental illness (Moore, Sheiers, Daly, Mitchell, & Gaughran, 2015). If improved methods were identified to facilitate awareness of need for physical HRS, screening rates, follow-up, and outcomes of morbidity and mortality could be improved in those with SMI.

Section V. Prior Pilot Study by Researcher

There is limited reported testing of the HIP with United States populations with serious mental illness. The aim of the completed pilot study was to understand feasibility and acceptability of the HIP HRS tool by individuals with SMI in the United States. The pilot study was done with SMI in a Midwestern United States population. Thirteen subjects participated, four males and nine females. The subjects ranged from 27-62 years with a mean age of 44.4 years. Most, 10 of 13, participants had a high school education or greater. Nine were Caucasian with one reporting black ethnicity. Relationship status was equally represented between married, never married, and divorced or separated. Work status was equally represented as part-time, full-time, and disabled or retired.

Participants were recruited by direct invitation in an ambulatory mental health clinic or invitation letter via postal mail. The participants were all actively receiving mental health medication prescriptions from providers. The pilot study found waist

circumferences to be similar to those found with previous study of the HIP in the United Kingdom (Appendix C). In the pilot study, waist circumference average was 99.6 cm and waist circumference found in a previous UK study averaged 98.1 cm. The BMI average measured however, was found to be 32.3 cm and exceeded the BMI found in the UK (30.5 cm) study (Shuel et al., 2010). Height measurement was by self-report for recovery group participants. Height measured in the clinic for the pilot study was completed by a mental health nurse (not the researcher) which could have impacted BMI calculations.

Pilot findings informed the development and planning of the current study. The pilot study identified that individuals with SMI were accepting of completing the HIP, but required specific recruitment strategies to commit to the time needed to complete the HIP physical HRS. Recruitment strategies suggested by previous research were used in the pilot study, though recruitment was still challenging. An orientation letter described the nature of the HRS and gave information about how individuals could volunteer to participate. One participant reported an emotional response surrounding having waist circumference measured. The emotional response resulted from or after thinking about needing to lose weight when having waist circumference measured.

Waist circumference measurement was the item with the most physical contact on the HIP. Overall, there was little feedback offered in written or verbal comments about the data collection process, despite one-on-one contact with the researcher and ample opportunity for participants to verbalize reactions. This indicates participants were accepting of the process once they accepted the invitation and provided informed consent to participate in the pilot study.

The pilot study findings were reassuring that those with SMI were accepting of and willing to participate in HRS and paper and pencil tools regarding physical health risks. HRS had previously been done primarily in clinic settings. The pilot study found that those with SMI agreed to participate in community-based screening sessions once the need for this type of screening was described and introduced. This information guided the recruitment plan for the proposed study.

Section VI. Summary of Literature Applied to Proposed Intervention.

Effective HRS for individuals with SMI is broad and addresses barriers (response costs) and facilitators (rewards). HRS effect on intention to act is maximized by consideration of PMT theory components of risk appraisal (perception of risk of health consequences) and coping appraisal (self-efficacy for health, response efficacy) as applied to individuals with SMI. HRS using a formalized tool such as the HIP, which assesses multiple potential health risk areas including gender-specific health risk assessments has potential to improve HRS processes (White, Gray, & Jones, 2009).

HRS can be maximized by targeting accessibility and limiting requirement for transportation, thus reducing response costs (Castillo et al., 2015) for participants. Training mental health nurses regarding physical health risks in those with SMI (Hardy, Hinks, & Gray, 2013) will encourage increased rates of HRS and improve collaboration of HRS in individuals with SMI. Strategies of HRS that are most effective use nurses to administer the HRS and recommend follow-up to reinforce participants' ongoing monitoring of physical health risk (Happell, Stanton, McKenna, & Scott, 2014).

Also, included in effective HRS is use of brief, compact format to limit required resources and reduce health care system (environmental) response costs. Written

feedback to participants delivered as a health risk report, as included in the current study also, can encourage collaboration with primary care providers and improve participants' self-efficacy in their ability to follow-up with primary care on health risks identified in HRS.

Chapter Three: Method and Procedures

This chapter reviews the study design, sample, and setting. The procedure, ethical issues, and plan for analysis are discussed. The aim was to quantify the relationship of physical HRS using the HIP, with other study measures. Measurements included perception of physical health risk (risk appraisal), self-efficacy for health behaviors, and plan for follow-up medical care visits for identified physical health risks.

Design

The study design was correlational (Polit & Beck, 2012b; Harris, et al., 2006). The correlational design uses non-random (convenience) participant selection, meaning subjects are self-selected (Polit & Beck, 2012c). This study used convenience sampling because there is a small accessible sample (Harris et al., 2002). This study uses both descriptive and predictive correlational approaches. Both of these approaches us naturally occurring phenomenon and do not manipulate variables. Predictive correlational design seeks to predict the variance of one or more variables based on the variance of another variable (Sousa, Driessnack, & Costa Mendes, 2007).

The naturalistic setting was desired to closely resemble the setting which individuals with SMI, who would benefit from health risk screening, would access ongoing care. Use of the naturalistic setting improves the ability to generalize findings to the care settings accessed by individuals with SMI. Random assignment of participants is impractical in the naturalistic setting (Harris et al., 2002). Community health settings afford less ability to control environmental factors, therefore, a correlational design is the ideal method to measure the relationship of health risk screening with study variables in individuals with serious mental illness (Polit & Beck, 2012c).

Previous studies measured baseline data from the HIP (Bressington et al., 2014; Hardy et al., 2013), but did not measure relationships of HRS to other cognitive factors or actions regarding health risks. This study design affords identification of relationships of the HIP risk score with self-efficacy, perceived health risk, and intention to follow up with primary care providers in individuals with SMI.

Setting

Participants were recruited from a rural Midwestern ambulatory mental healthcare clinic and recovery groups in the surrounding community. The participants were recruited from a small city (population approximately 50,000) and surrounding community. Recovery group participants were recruited from aftercare services and support services in the community. The community included individuals in agricultural, small business, technical, retail, and industrial trades. Centers of business in the community surrounding the city have limited outreach access to specialized medical care (S. Clark, personal communications, May 13, 2016).

The clinic staff included three nurse practitioners, one licensed social worker therapist, and one psychiatrist. Additionally, there is a site receptionist and registered nurse (RN). The clinic is an independently owned ambulatory care practice and has a monthly census of approximately 125 patient visits. Initial medication management visit appointments are 60 minutes, follow-up visits are 30 minutes, and therapy visit appointments are 60 minutes in length. The clinic accepts fee for service payment from public and private insurances and has a low proportion of clients that self-pay for the clinic services (S. Clark, personal communications, May 13, 2016). The researcher collected data in a private room in the clinic to offer confidentiality and privacy.

Payment for services at the clinic is generated from third-party sources almost exclusively. Medicare and state-assisted insurance provide payment for a majority of clients. There are several clinics in the city where participants were recruited from that provide mental health services on a fee-for-service basis and one that accepts payment based on income. The clinic participants were recruited from has been in existence for approximately five years. The clinic specializes in providing mental health care (S. Clark, personal communications, May 13, 2016).

The recovery groups meet in local treatment centers in the evenings. Local mental health professionals in the community refer individuals to the recovery groups. The groups meet weekly. There is an average of six to 10 members in each group (R. Kooiker, personal communications, May 13, 2016). The leaders of the recovery groups offered the invitation cards to group members. To participate group members called the number given on the invitation card. When recovery group members agreed to participate they were assigned an appointment date and time for data collection to be done in a private meeting room in the ambulatory care clinic.

Sample

Participants selected were persons seen at ambulatory care clinics for mental illness severe enough to require mental health medications. Participants were individuals who were seen in the ambulatory care clinic or in a community recovery group in the past calendar year for a SMI diagnosis. Participants were required to be able to give informed consent (no guardian or conservator assigned), be 18 – 65 years of age, English speaking, and have currently prescribed medication for their mental illness. The HIP was studied previously on adults 65 years and younger. Exclusion criteria were

having been hospitalized in the past two months, being pregnant, being non-English speaking, or having a guardian or conservator assigned. The clinic community was predominantly Caucasian in background. Clinic clients were 90% Caucasian. Most of the clinic clients were unemployed or disabled and have supportive services in place to maintain their functioning.

Sampling Plan

Participants recruited from the clinic and recovery groups were assessed on the study variables. Individuals that met age and diagnosis criteria for participation were contacted by letter before their appointment. Invitation letters were generated by the electronic medical record (EMR) computer system and sent via postal mail in a manner like appointment reminders that are sent in the usual course of care. Reception staff members, who already had access to the potential participants' information in the usual course of care to protect confidentiality, printed invitation letters. The pre-appointment invitation letter to participate was sent two weeks prior to appointments. When potential participants were called to remind them of their appointment they were asked if they had questions about the invitation for the study and if they wished to schedule an appointment to take part. The data collection appointments were arranged by phone or during an office visit.

Individuals with SMI are more likely to participate in a research study if approached directly by a provider or mental health nurse (Hardy & Gray, 2012b), offered financial reimbursement, or given a written (orientation) letter before a face-to-face invitation (Reda, Rowett, & Makhoul, 2001). As part of the invitation, participants were

informed they would receive a stipend of $15.00 to compensate for their time and participation in the study.

Recovery groups were used to assist with obtaining an adequate sample size. Recovery group organizations offered recruitment post-cards to individuals in their groups. Individuals called the number on the card to request more information or to set up an appointment to participate in the informed consent process and participate in the study. The researcher did not have access to the names or addresses of recovery group participants.

Sample size was 54 participants. Sampling continued until the study sample was filled and target sample size was obtained. Herzog (2008) maintained a target number of 25 is a minimal number of statistical stability in analysis. Enrolling a minimum of 50 participants allowed for analysis to remain reliable should some participants have chosen to leave the study.

Power Analysis.

The effect size gained through HRS is relatively unexplored for those with SMI, thus findings for general populations are given. The odds ratio for uptake of health screenings for identified risks is 1.22 (range 1.17 to 1.42), with non-significant differences between group findings (Edwards, Uniqwe, Elwyn, & Hood, 2003).

The effect size for self-efficacy was measured as moderate (d=0.51) for intent to act (protection motivation) and small to medium for changes in behavior (d=0.47) by meta-analysis (Sherran et al., 2016). Physical activity intervention studies would generally be more intensive than the current study and have been found to have effect sizes of 0.44 (Gourlan, Trouilloud, & Sarrazin, 2011) and 0.48 (Chase & Conn, 2013).

There are no directly comparable effect sizes generated from health risk screening in individuals with SMI to use in identifying the target sample size for this study. The study used a significance level of 0.05 and a power of 0.70. An estimated small to medium effect size required 35-40 subjects to be an adequate sample size for a preliminary or pilot study (Hertzog, 2008).

The primary research question required regression analysis, for which a sample of 30 is needed for the independent variable (H. Wey, personal communication, April 22, 2016). Ten additional events are required for each additional variable included in the regression analysis (Vittinghoff & McCulloch, 2007). Two additional variables were included in regression analysis thus a minimum sample size of 50 was required. Use of the minimum sample size limits the ability to quantify the effect of HRS in individuals with SMI, as larger sample sizes are able to support more inferential analysis. This study, because it is preliminary in nature, used the minimum sample of 50 individuals with SMI as participants in HRS. The use of a minimum sample size is justifiable as there is limited previous study of standardized HRS in individuals with SMI (Allen et al., 2011; Baller et al., 2015; Emerson et al., 2016).

Study Procedure

Study Process

Human subject board review and consent was requested and secured from South Dakota State University Human Subjects Committee under approval number IRB-1708002-EXP. Human subject approval was also gained from the administration of the out-patient clinic. Individuals participating were reimbursed $15.00 for their time completing the study tools. Ambulatory care participants were recruited by an invitation

letter prior to attending appointments, at clinic appointments themselves, and at recovery group sessions.

Participants from the clinic were mailed an invitation that was generated from the EMR, then they were called for an appointment reminder and again asked if they would participate. At the clinic check-in the clients were given a third reminder of the study opportunity. After the office visit appointment, if a client agreed to participate, an appointment for data collection was set up with the client. Clients who responded to the mailed invitation or returned the recruitment card were contacted by phone initially and then a data collection appointment time was scheduled.

Participants were recruited by contacts made through recovery groups in the community. Participants from recovery groups were offered an invitation card at a support group meeting. If they agreed to participate, they met with the researcher at a scheduled time for data collection in a private meeting room in the ambulatory care clinic. They were not registered as patients at the ambulatory care clinic.

Data collection was done face-to-face, during a data collection appointment and included the informed consent, biological parameters, the HIP, demographic data collection form, and self-efficacy for health scale (SRAHP), perceived health risk, and intention to follow-up with health care. See Appendix F for the order of administration of data collection tools. Data on the HIP was verified and recorded into the HIP screening tool paper form. After informed consent was obtained, participants completed the study tools.

The tools were paper and pencil tools and completion was with pens or permanent ink by participants and researcher. The reading material was set at a fifth-

grade reading level with an alternative format of verbally reading the information to the participant if they requested it. Individuals who reported less than high school education were offered to have tools read to them. Bastable (2007) found individuals may have a reading level up to four grades below the achieved academic level. Instructions for completion of each assessment tool were verbally explained to participants if requested. Pilot testing showed acceptable completion of tools by participants independently. If participants missed the scheduled data collection session (after they agreed to participate) they were contacted up to three additional times to reschedule the session. If unable to reschedule after three attempts, participants were dropped from the study.

Participants were asked if they were willing to be contacted in the future for research regarding follow-up HRS via the HIP. The consent form included information about the opportunity to participate in future study and an additional consent was signed by participants if they agreed to this. The HIP tool recommends re-screening yearly for individuals with SMI. Future research, if done would occur after completion of the present study.

Participants completed the Self-Rated Abilities for Health Practices scale (SRAHP), the HIP, Demographic Data- Participant Form and the Demographics/Supplemental Data- Interviewer Form. Included in the Demographics/Supplemental data- Interviewer Form were questions about perceived health risk (risk appraisal) and intention to follow-up with care for identified health risks. The items of perceived health risk (risk appraisal) and intention to follow-up were also administered following the completion of the other study tools (second administration). All participants completed all the study tools, the HIP tool, and had biological measures

and chart data completed and entered onto the study data forms. Biological measurements were taken during ambulatory care clinic visits or in separately arranged appointments. Study tools were administered by the researcher. Data collection took approximately 40 to 50 minutes.

Participants were given the HIP which assesses health risks as part of participation in the study (see Appendix G for HIP tool items). The HIP was administered by the researcher who is trained in administration of the HIP. The HIP administration training included methods to provide health risk recommendations in areas identified as at risk when participants completed the HIP. Data collection was done by the researcher.

After completion of the HIP, participants received feedback on the HIP risk areas via both verbal recommendations and a paper copy of the Health Risk Report Form. Recommendations regarding items rated as at risk (red) were given according to the HIP administration manual. Participants were given a copy of their completed Health Risk Report form to bring to their next primary care medical appointment. See Appendix G for the male HIP tool and Appendix H for the female HIP tool. Also, a recommendation was given to set up an appointment with a primary care medical provider to follow-up on the HIP if indicated according to the HIP administration manual. All participants received health education as usually provided during the course of ambulatory care and as part of recovery group participation.

Instruments

This study used the following instruments: Demographic Data Collection Form, Supplementary Data Collection Form, Self-Rated Abilities for Health Practices scale

(SRAHP), the HIP, perceived health risk, and intention to follow up with medical care for identified health risks. The SRAHP is a self-efficacy for specific health behaviors measure (see Appendix A). HIP was the chosen tool used to complete physical HRS for this study.

Data Collection Forms

Demographic information was collected for all participants via a demographic data collection form that included age, gender, ethnicity, occupation, and employment status (Appendix J). Also, collected were mental health diagnosis, mental health symptoms (chronicity), medical conditions, primary care clinic attended, current medications including supplements, and medication adjustments. Additional questions asked were perceived health risk for physical health problems and level of intention to follow-up with care.

Health Self-Efficacy

Bandura (1977) recommends situation specific measurement of self-efficacy. Thus, self-efficacy for specific health promoting practices was measured. Self-efficacy for health is a component included in the theoretical framework, the PMT, and measured via the SRAHP scale.

The SRAHP includes 28-items asking about four areas of health self-efficacy including exercise, well-being, nutrition, and health practices (Becker et al., 1983). SRAHP tool (Appendix L) that was administered. Items are rated on a 5-point Likert scale ranging from a response of zero for not at all to a response of four completely. In previous study, a general population of individuals at a health fair had a mean SRAHP score of 92, when the maximum possible score was 112. SD was 16.91. The average

SRAHP score in individuals with hearing disability, a population with chronic limitations, was 77.87 (Jones et al., 2007). The SRAHP results show that lower scores of self-efficacy for health practices occur in individuals with disabilities (Becker & Schaller, 1995).

In previous studies SRAHP items had loadings ranging from 0.36 for self-efficacy for teeth brushing to 0.86 for finding a community location to exercise. Subscales had acceptable reliabilities for exercise 0.92, well-being 0.81, nutrition 0.90., and health practices 0.86 (Cronbach's alpha) in scale testing (Becker et al., 1993; Jones et al., 2007). Reliability of the SRAHP total scale score was Cronbach's alpha of 0.92 in health fair attenders and 0.94 in a college age population (Becker et al., 1993). Face validity was demonstrated.

Significant correlation was shown between the SRAHP and general measures of self-efficacy (Becker et al., 1993). Factor analysis found the four main components measured in the validity scale accounted for 61% of the variance in health practices to reduce risk. The four components with the most influence of the SRAHP scale are exercise, nutrition, responsible health practices, and psychological well-being (Becker et al., 1993).

The SRAHP instructions ask respondents to answer as to the level of perceived ability to perform the health behaviors, as opposed to their actual level of performing them. However, previous study mentioned that individuals may have answered SRAHP items considering their tendency to perform them instead of perceived ability to perform them. This is an aspect for further study of the SRAHP. The SRAHP scale, however, is suggested in previous study to have utility in evaluating health programs and

interventions. The SRAHP scale also identifies specific areas of health self-efficacy that could be improved by interventions to increase intention to act and action toward preventative behaviors (Becker et al., 1993). These are aspect of the SRAHP tool that warrant further study.

Health Improvement Profile

The HIP is a health risk-screening tool developed by a systematic review of literature to standardize conversations with clients about physical health risks and recommendations for action (White et al., 2012). The HIP was designed by a mental health nurse to elicit physical health risks relevant to individuals with SMI. The HIP is a brief, structured, HRS tool administered via one-on-one interview in community settings. The HIP assesses a broad range of physical health risks in individuals with mental illness.

The HIP has two versions a male tool and a female tool (Appendix G and H). Both versions of the tool were used. The HIP male version is designed for males and the female version for females. The HIP includes 27 items (26 items male version) as indicators of health risk in individuals with severe mental illness. Health risk is quantified as the number of items with risk. The HIP assessment areas were tallied and reported as number of "red" risk areas. In previous study, no adjustments were used to designate a difference in total risk scores for males compared to females, so total number of red risk areas will be used without separating male versus female scores (White, Hardy, & Gray, 2012).

The HIP has acceptability and feasibility testing in individuals with SMI in several European countries and in Hong Kong, China (Bressington et al., 2014). There

are no published studies that utilized the HIP in United States populations. The HIP requires approximately 40 to 60 minutes for completion and has been studied exclusively using face-to-face interview with a trained nurse administering the tool.

The general areas of health risk screened by the HIP are cancer prevention, substance use, nutrition, exercise, biologic parameters of health risk, fluid balance, and sexual health (White et al., 2012). This brief tool scores individuals on a range of physical health risks as red for risk or green for not at risk. Risk areas elicit advice for behavioral change and follow-up given by the nurse (White et al., 2012).

The HIP was found to have acceptable face validity, patient acceptability, and clinical utility with individuals with SMI in the United Kingdom (White et al., 2009; Shuel et al., 2010). Testing in Hong Kong, China (Bressington et al., 2014) and other European countries found the HIP useful as a clinical tool (Shuel et al., 2010). There is limited information about use of HRS with HIP in United States and limited quantification of outcomes or follow-up care after HIP manual designated recommendations (Bressington et al., 2014).

The HIP measures biological and behavioral parameters in gender-specific formats, scored as red for risk (action required) or green for health, no risk (see Appendix D) for items the HIP assesses. Red items are tallied, and this score is recorded as HIP total risk or total physical health risk score. The items on the HIP profile include vital signs, waist circumference, body mass index, metabolic parameters (lipid levels, glucose), and liver function tests as standard biological measures. Self-report items in the HIP include prostate checks for males and cervical screening and menstrual cycle assessment for females. Recording of last breast check is included for both genders.

The general self-report items included in HIP include sleep, dental exam, eye exam, feet check, urination, bowel patterns, fluid status, safe sex, sexual satisfaction, exercise pattern, and healthy diet intake. Substance use status is assessed for several substances including alcohol, caffeine, and cannabis (White et al., 2009).

Each parameter has recommendations associated with a red (risk) score. The recommendations for follow-up are described in the HIP administration manual. Red scores were designated to result in manualized recommendations (Hardy & Gray, 2010), consideration of a medical visit, and recommendation for completion of a repeat HRS (White et al., 2012). Individualized recommendations given in risk areas may improve follow-up for identified physical health risks.

Perceived Health Risk (Vulnerability)

Perceived health risk (vulnerability) was measured using a one sentence item developed by the researcher. Individuals generally are able to report their relative risk level as perceived risk (van der Plight, 1998). The perceived risk (vulnerability) item read, "Rate your level of perceived threat for developing physical health problems provided you do not change your current health practices." Perceived risk relates to the PMT concept of risk and vulnerability. This is a perceived risk question that is conditional upon the present situation and behaviors and aligns with the theoretical construct of perceived risk appraisal of vulnerability according to the PMT (van der Plight, 1998).

Single items are often used to measure perceived vulnerability according to the PMT model in previous study (Plotnikoff et al, 2005; Norman et al., 2005). Participants marked their choice on a 100 mm visual analogue response scale. See Appendix I. The

choice of number 1 connoted no risk, while the choice of a number 10 suggested the highest risk possible (likely to get a negative physical health event) of illness. Participants were instructed to circle the number they associated with their personal risk. Participants rated perceived risk before and after the HRS on the 1 to 100 mm scale.

Intention to Follow-up in Primary Care

Intention to follow up in care for health risks was measured by the one sentence question, "Rate your level of intention to follow up with an appointment in primary care to address physical health risks." See Appendix I. The use of a single-item measure of intention to follow-up was chosen as it is a concrete concept, the population completing the study were diverse, and the sample size was limited by difficulty in recruitment (Fuchs & Diamantopoulos 2009). These factors lend to acceptability of a single-item measure of a construct according to Fuchs and Diamantopoulos (2009).

The response scale (ruler) lists responses from no intention to sure to follow-up for ongoing care for identified health risks. The response ruler will measure confidence on a visual response scale. Confidence rulers have been found to be positively associated with stage of change in studies of behaviors to reduce health risk such as smoking cessation (Boudreaux et al., 2012). Single-item response scale rulers have shown reliability to quantify subjective measures such as quality of life and physical health (de Boer et al., 2004). Response scale rulers differ from visual analogue scales in that they are unidirectional whereas instead of bidirectional (eProConsortium, 2018). The responses indicate increasing agreement but not disagreement with the single item statements in this study.

Participants rated intention on a line from no intention to follow up and sure to make a follow up appointment (certainty of following up) within two months with a primary medical care provider. The response scale had four value labels placed at equal intervals (zero mm, 20-40 mm, 60-80 mm, and 100 mm) along the 100 mm visual analogue line. Participants placed an X on the line to rate their likelihood of follow-up within the next two months with a primary care provider for their physical health risks that were quantified by the HIP tool.

Visual response scales are preferred over numerical response scales as they offer more differentiated measurement of responses (Kuhlmann, Reips, Wienert, & Lippke, 2016). The value labels were equal intervals as it is not expected that there would be positive response bias based on previous health risk screening study (Masino & Lam, 2014). The response scale included words as value labels in addition to the line which measured 100 mm for participants to place a response on. Words as value labels on response scales had been found to improve response rates (Masino & Lam, 2014). Likelihood to follow up was rated by all participants by this one item question before and after completing the HRS (the HIP tool).

Physical Activity Level Measures

Biological measures are the most reliable way to measure physical activity. Accelerometers, pedometers, and water displacement are more accurate to quantify total energy expenditure than self-report (Clemes, O'Connell, Rogan, & Griffiths, 2009; Danilack, Osarenoma-Okunbor, Richardson, Teylan, & Moy, 2015; Plasqui, Bonomi, & Westerterp, 2013), but are more time and resource intensive and not feasible in community settings (Ryan & Gormley, 2013). Use of self-report measurement has fair

agreement with objective accelerometer measurements of physical activity in the general population and those with mental illness (Faulkner, Cohn, & Remington, 2006). Self-report questionnaires are valid and reliable for classifying physical activity. Self-report questionnaires are also less cumbersome to implement than a seven-day diary or recording of a pedometer or other wearable devise in general populations (Stel et al., 2004).

Self-report measures of activity can be used in community-based settings as a surveillance tool (Faulkner et al., 2006). Because the proposed study is community based and targets lifestyle activity self-report of activity is most feasible. The self-report exercise item on the HIP, physical HRS, was used to assess physical activity as at risk or not at risk. The physical activity item criteria were 20 minutes of physical activity at least five days per week.

Biologic Measures

Biological parameters were measured in three distinct ways: vital signs measured by a mental health nurse, laboratory and biometric measures measured by chart audit, and clinic and laboratory monitoring measured by self-report. Blood pressure was measured at rest while seated, legs uncrossed, with a sphygmomanometer using cuffs ¾ the size of arm diameter. Weight was measured standing without shoes using an analogue scale that had been calibrated to a one-half pound accuracy using scientific weights.

Waist circumference

Cardiovascular risk and all-cause mortality correlate positively with measures of waist circumference (Ross et al., 2008). Waist circumference is a good screening

measure of abdominal (visceral) fat (NHLBI, 2000). Waist circumference is also a more stable indicator of cardiovascular health risk then hip circumference measures are (Seidell, Perusse, Depres, & Buchard, 2001).

The waist circumference measurement protocol targeted the point midway between the lower rib (lowest palpable rib) and the iliac crest at the mid-clavicular line (as recommended in the HIP administration manual). Measurement was taken level and parallel to the floor after several consecutive natural breaths. The tape measure was wrapped snugly around the subject, but not constricting. This is the method recommended by the World Health Organization (2008) and method of choice for individuals with chronic illness (Castillo et al., 2015). The World Health Organization procedure for waist circumference measurement is the method recommended for use with the HIP.

For those individuals with SMI the procedure which measures waist circumference mid-point between the lower rib and the iliac crest is practical for screening processes and is readily taught to mental health nurses (Hardy & Gray, 2012a). Waist circumference measurement protocol was standardized for reliability according to the procedure identified by the World Health Organization (2008). All waist circumference measurements were obtained by the researcher. If the measurements were within 1 centimeter of each other the mean was calculated. If the measurements exceeded 1 centimeter difference between the two measurements, the measurements were repeated to help reduce errors in measurement of waist circumference for each participant (Verweij et al., 2013, World Health Organization, 2008). This is the procedure recommended by the HIP administration manual also.

Confidentiality, Informed Consent, and Protection of Human Subjects

The study was approved by the Human Subjects Committee at South Dakota State University and the administrator of the ambulatory care clinic. In the informed consent process, participants were instructed that information collected for the study is confidential. They were told the information may be reported in a written research report, however any publication would not disclose their identities or link them to the data by name, title, or any other identifying information. All data collected were associated with a participant number only (and never any other identifying information). Each participant received a copy of the informed consent document.

See the informed consent form in Appendix M for details about approaches which protected participants, quantified level of risk, and reduced risk of participation in the study. Also, procedures to protect data were outlined in the informed consent. It is possible there may be unknown risks to informing individuals with SMI of their physical health risks, but no adverse effects were reported in previously published studies that have used the HIP. Participants were instructed regarding their freedom to withdraw at any time during the study without any interference with future mental health care.

Methodological Threats and Mitigation of Threats

Potential methodological threats of this design plan included external threats, internal threats, data collection process irregularities, measurement instrument related drawbacks, and potential unique sampling variations. The main potential threat to generalizability of findings was that the study was uncontrolled or clinical in its setting. Findings may only be generalizable to individuals with SMI in similar rural geographic

areas as the study participants. Use of greater than one data collection site was planned to improve generalizability.

There is only preliminary understanding of health risk screening in individuals with SMI, meaning there may be methodological threats that are not quantified. There are likely unknown barriers and potential risks to HRS in individuals with SMI. Those agreeing to undergo HRS are likely to be generally motivated to improve their health, and those less motivated for health improvement are likely to decline to participate. Participants in the pilot study were willing to participate at high rates, which suggested that wellness orientation bias was not highly prevalent.

Internal threats to reliability of the study data were possible systematic differences between the outpatient behavioral health clinic and the recovery group participants. Use of inclusion criteria was implemented to limit the potential for excessive sample variability as a source of error and to improve rigor.

Measurement process limitations that threatened the reliability and validity were that self-report was used for several of the HIP items. Individuals could systematically report more positive health behaviors than they really engage in to attempt to appear less impaired or in a more positive view to the data collector. However, the HIP tool has been studied previously and appears to be a valid representation of individual's health risk status (Shuel et al., 2010). Inter-rater reliability is not known for the HIP. The author was trained in the process of completion of the HIP, per the HIP protocol manual training.

Chapter 4

Results and Analysis

Introduction

This chapter reports the results of the data analysis. The data cleaning process is noted along with the overall description of the data. Demographic data and descriptive data results are described. Correlational and regression analysis results pertaining to the study's research questions are reported.

Results

Following the data collection phase, the researcher entered data into a computer spreadsheet. Data points were treated confidentially, with no names associated with the data. Data were checked for accuracy related to data collection sheets. The data were rechecked for outliers as a method of data cleaning. Several data points found to be outliers were data that had been mis-entered and were corrected. Data was entered into an excel spreadsheet which was used in the data analysis program.

Missing data were tallied and there was less than 15% of any data collection points missing for any participant for any of the data collection tools. There was less than 20% of items rated at the ceiling or floor (Wang, Zhang, McArdle, & Salthouse, 2009). Missing data was limited to occasional missed items in the SRAHP tool, three missing waist circumferences (clients declined waist measurement), and three missing weight and height values. When a data point was missing, the mean score was imputed for the variable. The physical health risk score, HIP, HRS tool had a 99% completion rates in pre-study (pilot study) testing and a 98% completion rate in the current study administration.

Demographic Results

Results for the demographic variables are presented in Figure 3 and Tables 6 and 7. Participants included 24 males (44%) and 30 females (56%) ranging in age from 21 to 65 years (mean = 46). See Figure 3. Forty-seven (87%) of the participants were Caucasians, while four (7.4%) were Hispanic, two (3.7%) were Black, and one (1.9%) was Native American (see Table 6). Nineteen (35.2%) of participants were married, 16 (29.6%) were separated or divorced, and 15 (27.9%) were never married. Additionally, regarding marital status, three lived with partners, and one preferred not to answer. Forty-eight of the 54 participants (89%) had at least a high school level of education. The family size variable had a mean of 2.4 people with one child or less on average in the home. Most participants (45 or 48.5%) reported they were employed (see Table 6).

Figure 3

Demographic Findings.

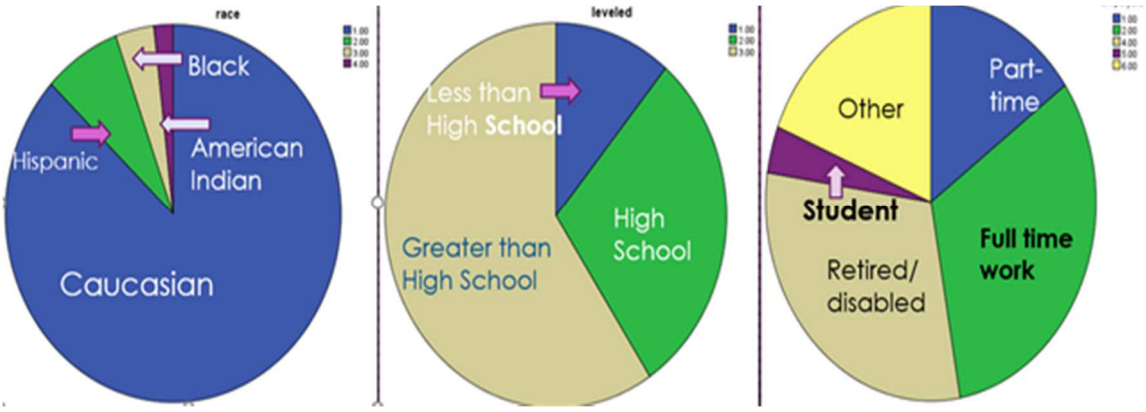


Table 6

Descriptive Item Frequencies

Item		Frequency	Valid Percent	Cumm Percent
Gender	Male	24	44.4	44.4
	Female	30	55.6	100.0
Education	Less than HS	6	11.1	11.1
	High School GED	16	29.6	40.7
	Some College or Degree	32	59.3	100.0
Race	White	47	87.0	87.0
	Hispanic	4	7.4	94.4
	Black	2	3.7	98.1
	American Indian	1	1.9	100.0
Relationshp	Married	19	35.2	35.2
	Divorced/Separated	16	29.6	64.8
	Never Married	15	27.8	92.6
	Live with Partner	3	5.6	98.1
	Prefer not to Specify	1		100.0
Employ	Fart-Time	8	15.0	15.0
	Part-Time	17	31.5	48.5
	Volunteer	0	----	-----
	Retired/Disabled	16	30.0	78.5
	Student	2	2.2	80.7
	Other	10	18.5	100.0
Diagnosis	Major Depression	49		91.0
	Bipolar Disorder	16		31.5
	Schizophrenia/Schizoaffective	6		11.0
GeneticTest	Yes	10	18.9	18.9
	No	43	81.1	100.0
Anti-Psych	Yes	12	40.0	40.0
	No	18	60.6	100.0

Notes: relationship= relationship, HS = high school, GED= general education diploma, cumm- cumulative, anti-Psych = antipsychotic. Sample size was N=54. Except Genetic Test N=53 and Anti-psychotic N=30, employment = employyn, antipsych = antypsychme

Table 7

Descriptive Statistics

Item	Range	Std .Dev.
Age	21.6-65.0	13.1
Level of Education	1.0-3.0	.7
Family Size	0-10.0	1.7
Children Less than 18	0-6.0	1.3
Months Diagnosed	1-480.0	136.2
Months - MH Medication	1-480.0	122.7
Number-MH Medications	1-10.0	2.0
Number supplements	1-9.0	2.2
Number Other Rx ,	1-11.0	2.9
Number Diagnosis	1-5.0	.92

Notes: MH = mental health, Rx= prescriptions. N= 54 except age, months diagnosed, month MH medications N= 53. Months diagnosed = momi, month mh medication = momeds, number supplements = nosuppl, Number Other Rx = nootherrx,

Most participants, (79%) had never undergone a laboratory blood test to quantify their genetic profile and how it interacted with psychiatric medications (see Table 6). A larger percentage (91%) of the participants were diagnosed with major depression, compared to 11% with psychotic symptoms. Participants could report more than one diagnosis, so percentages total more than 100%.

The most commonly reported serious mental illness (diagnosis) was major depression (49 participants, 91%), next most frequent was bipolar disorder (16

participants, 30%), followed by schizoaffective disorder (six participants, 11%). Anxiety disorder was reported in 31 participants (57%) of the participants.

The number of mental health medications taken and months diagnosed with mental illness had a wide range among sample participants. Most had two children or less living in the households they occupied as shown in Table 7.

The HIP, the main study tool, was completed by all the participants. The BMI score ranged from 19-48, with a mean of 32. See Table 8. Seven participants (13.3%) met the healthy BMI, criterion of 25 or below. Waist circumference of 32 inches (80 cm) or less is considered ideal for health according to the HIP. Those meeting the healthy level of waist circumference were six (12%). Blood pressures measured were within the normal range for both diastolic and systolic blood pressure as described next. Those with systolic blood pressure in elevated range were eight (14%) and diastolic blood pressure in the abnormal range were six (11%). The mean blood pressure measurement was 124/79.

Table 8

Measures of Descriptive Data

Item	Number	Min	Max	Mean	Std. Dev
Body Mass Index	53	19.00	48.00	32.05	6.51
Waist Circumference	51	63.00	139.00	102.55	20.02
Systolic Blood Pressure	50	80.00	165.00	123.96	16.33
Diastolic Blood Pressure	50	49.00	97.00	78.88	11.50
Number No Risk - HIP	54	11.00	24.00	17.78	2.89
Number Yes Risk – HIP	54	2.00	13.00	7.94	2.62
Waist Circumference	51	33.00	139.00	102.55	20.02
SRAHP – Total Self-Efficacy	54	35.00	111.00	77.44	20.66
Pre-Test Perceived Risk	52	.00	100.00	40.59	30.59
Pre-Test Intention	53	.00	100.00	75.83	33.88
Follow-Up					
Post-Test Perceived Risk	52	.00	100.00	47.02	28.08
Post-Test Intention	52	.00	100.00	80.40	30.50
Follow Up					

Notes: Dev = deviation. HIP- Health Improvement Profile, SRAHP = Self-Reported Abilities for Health Practices. Waist circumference was measured in centimeters. Blood pressure measured in millimeters of mercury. Maximum possible on SRAHP scale was 112. Min = minimum, Max = maximum, Std. Dev. = Standard deviation

Measurement Tool Results and Reliability

Test-Retest reliability for the single-item researcher developed items is shown in Table 9. Each of the single item tools was administered before the participants completed the HIP and after they complete HIP. Pre and post measures of the single

item tools were used to calculate test-retest reliability of these items as administered in the study (Leppink, & Perez-Fuster, 2017). Perceived risk of health problems item test-test reliability calculation was 0.68 and intent to follow-up item reliability calculation was 0.74, as calculated by SPSS 24 (SPSS, 2017). Since there are not multi-item scales available to measure perceived risk (threat) of health problems and intention to follow-up these single item questions were used in this study.

Table 9

Reliability Coefficients of Self-Report Single Item Variables

Scale				
	Reliability Coefficient	Mean	Standard Dev	Number of responses
Perceived risk for health problems	0.68	40.59	30.01	54
Intention to Follow-up	0.74	78.31	33.06	53

Notes: Dev=deviation

The study tool reliabilities were calculated for the SRAHP. The study tool SRAHP, used to measure self-efficacy for health, was evaluated for reliability using SPSS Version 24 Cronbach's alpha calculation. The split half reliability was calculated for the study administration of the SRAHP tool. The first half reliability was 89.3% and second half was 91.3%. The total scale score alpha was .94 (SPSS, 2016). Calculations found the item scores to range was from 2.3 to 2.8. The SRAHP full scale mean score was 79.3 of maximum of 112 (standard deviation 20.0). The SPSS Output for calculation of the SRAHP tool test-retest reliability is shown in Table 10. Calculations noted that deleting items would not improve the reliability (SPSS, 2017). SRAHP

reliability calculations from previous research for the full scale and the four subscales it measures were also found to have acceptable levels of reliability (Becker et al., 1993).

Table 10

Reliability Results for Self-Reported Abilities for Health Practices (SRAHP)

		Mean	Minimum	Maximum	Range	Reliability Coefficient
Item Means	Part 1	2.725	2.4	3.2	.769	.893
	Part 2	2.878	2.2	3.7	1.45	.913
Total Scale Score		79.3		112		.942

Inferential Results

Bivariate Pearson correlational analysis and linear regression analysis were conducted on study variables to answer the research questions. The analysis describes the relationship of perceived risk for health consequences, self-efficacy for health, and HIP health risk screening score with intention to follow-up in primary care. Correlational analysis and regression analysis describe associations between HRS (HIP) total (cumulative) risk scores and the measurement tool scores (Polit & Beck, 2013c).

Results for Research Question 1

Question 1 asks: Does perceived health risk, self-efficacy for health, and physical health risk score infer intention to follow-up with primary care in persons with SMI? Linear regression analysis quantified the relationship between perceived health risk, self-efficacy for health total score (srahptot), health risk (HIP) total risk score (riskhprobpt)

and intention to follow-up in primary care. Perceived risk was measured before and after the HIP HRS (for internal consistency reasons). The post HIP measure of perceived risk was used in the regression analysis. A standard linear regression method was used to input all independent variables (predictors) simultaneously into a model to evaluate what they added to prediction of the dependent variable. The extent to whether, intention to follow up, was inferred by the independent variables was examined via an overall F-test (Statistical Solutions, 2013).

Results for the regression analysis are reported in Table 11. Perceived health risk score (riskhprobpt), self-efficacy for health total scale score (srahptot), and physical health risk, HIP total risk score (hiptot) were entered in a simple regression (see Table 11) and found to lack significance in predicting intended follow up with primary care, $R = .224$, $F(3)= 0.882$, $p = 0.457$ (see table 11). Thus, these study variables do not significantly infer level of intention to follow-up-in primary care for physical health risks.

Table 11

Regression Model with Intention to Follow up as Dependent Variable

Model	Beta	Std Error	Alpha
Constant	71.011	27.833	.014
riskhprob	-.019	.235	.935
srahptot	-.479	1.830	.795
hiptorisk	.259	.164	.121

Notes: R2 = 0.050 (p< 0.023). Notes: Predictors (independent variables): health improvement profile total score, (hiptot), perceived health risk (riskhprob), health self-efficacy total scale sore, (srahptot). Dependent variable is intention to follow up.

Table 11 Regression Model

The variance inflation factors (VIF) were found to be .01, .03., and .01, for the independent variable indicating no concerns with multicollinearity (Statistical Solutions, 2013). The standardized coefficients tested residual distribution values suggested normal distribution of the data. Sample size of a minimum of 10 observations per predictor was used (54 observations used) to improve the likelihood of normally distributed data and to position the data within mathematical assumptions for linear regression (Polit & Beck, 2012; Statistical Solutions, 2013).

Results for Research Question 2

Question 2 asks: What is the relationship between physical health risk score and perceived health risk level for physical health problems in persons with SMI. A Pearson Product Correlations were calculated between the variables physical health risk score

(HIP total score) and perceived physical health risk. Pearson product moment correlations analysis quantifies the strength and direction of the relationship of two variables measured in different units that were presumed to be normally distributed (Laerd, 2013).

Correlational analysis was done using Pearson Product Moment coefficient analysis to identify the strength of the relationship between health risk total (HIP) score and perceived health risk. The total health risk score indicated by total number of HIP items rated as at risk and the perceived risk of health problems item were not significantly correlated ($r=.162$, $p < 0.242$) (see Table 12).

The second part of question two sought to answer: What is the relationship between physical health risk score and self-efficacy for health in persons with SMI? An analysis was done between the variables of physical health risk (HIP) total risk score and the SRAHP total scale score. Total HIP score, physical health risk item, was not significantly correlated with SRAHP self-efficacy total score ($r= -.263$, $p < 0.055$). When HIP risk levels were divided into high-risk and low-risk levels, the relationship of health risk level and SRAHP total was significant ($r= -.309$, $p < 0.023$). This is a negative relationship, as the level of physical health risk increases, the SRAHP self-efficacy for health decreases. Also, SRAHP was significantly negatively correlated with participants' perception of health risk ($r= -.319$, $p = < .019$). This finding suggests that those with higher perceived physical health risk have lower levels of self-efficacy for health (see Table 12).

Table 12

Question Two and Three Correlational Results. Pearson Correlations for Selected Study Variables

		a	b	c	d	e	f
a	Corr						
	Sig.						
b	Corr	.784**					
	Sig.	.000					
c	Corr	-.263	-.309*				
	Sig.	.055	.023				
d	Corr	-.170	-.155	.805**			
	Sig.	.218	.264	.000			
e	Corr	.078	.085	-.319*	-.308*		
	Sig.	.573	.540	.019	.024		
f	Corr	.162	.170	-.232	-.128	.515**	
	Sig.	.242	.219	.091	.355	.000	

Notes: **Correlation is significant at the 0.01 level (2-tailed).
*Correlation is significant at the 0.05 level (2-tailed). a = number reds HIP, total risk, b = HIP high and low risk, high or low number items risk on HIP, c = srahp total score, d = SRAHP high, low, e = perceived risk of health problems, f = perceived risk of health problems post-test, SRAHP= self-reported abilities for health practices scale, N= 54 except N=34 number of supplements, and N=50 risk health problems post test

Results for Research Question 3

Question 3 examp: What is the relationship of health risk score and perceived health risk level. Question-three was analyzed using Pearson Product Moment correlation coefficient test (SPSS, 2017). Correlational analysis of the variables physical health risk (HIP total score and perceived risk for health consequences was

completed (see Table 12). No significant relationship between total HIP physical health risks score and perceived health risk (r= 0.162, p< 0.242) was found.

Additional Findings and Results

Perceived risk of health problems, post-measurement was significantly negatively correlated with the months taking mental health medications (r= -0.296, p= 0.031). Also perceived health risk was negatively correlated with months diagnosed with mental illness. This suggests the longer the participant was taking mental health medication and diagnosed with mental illness the lower their perceived risk of health problems. Being employed was negatively correlated with physical health risk, post-measure rating (r= -0.296, p= 0.031) (see Table 13). Status of currently taking anti-psychotics was significantly related to physical health risk HIP total level, with those taking anti-psychotics being more likely to have elevated risk HIP total level of physical health problems (r= -0.353, p< 0.009). Also, months of mental illness was significantly negatively related to rated perceived health risk (r=-.271, p = 0.05) and intention to follow-up with care (r= -.322, p= 0.019).

Table 13

Pearson Correlations for Selected Study Variables

		a	b	c	d	e	f	g	h
a	Corr								
	Sig.								
b	Corr	.078							
	Sig.	.573							
c	Corr	.162	.515**						
	Sig.	.242	.000						
d	Corr	-.181	.499**	-.310*					
	Sig.	.191	.000	.022					
e	Corr	-.107	.153	-.271*	-.041				
	Sig.	.445	.273	.050	.770				
f	Corr	-.125	.013	-.296*	.054	.854**			
	Sig.	.374	.925	.031	.703	.000			
g	Corr	.353**	.077	-.021	.010	.124	.185		
	Sig.	.009	.580	.883	.941	.378	.184		
h	Corr	.002	.263	.221	-.227	-.322*	-.235	-.167	
	Sig.	.989	.055	.108	.099	.019	.090	.227	

Notes: **. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed). a = hip total risk, b = perceived risk, c = perceived risk post-HIP, d = employed yes/no, e = month with diagnosed mental illness, f = months on mh medications, g = antipsychotic medications yes/no, h = intent to follow-up in medical care, HIP = health improvement profile, MH = metal health, N= 54 except Months MI = 53 and Month MH Meds = 53

Additional significant correlations were noted between age and number of supplements taken ($r= 0.373$, $p< 0.006$) and age and waist circumference ($r= 0.335$, $p< 0.014$). As shown in Table 14, older participants took more over the counter supplements and had larger waist circumference. Systolic blood pressure was

significantly correlated with gender (r= -.328, p< 0.02), with males having significantly higher blood pressure in the current sample.

Table 14
Pearson Correlations for Additional Study Variables

		a	b	c	d	e	f	g	h
a	Corr								
	Sig.								
b	Corr	.125							
	Sig.	.372							
c	Corr	.373**	-.087						
	Sig.	.006	.625						
d	Corr	.247	.256	.181					
	Sig.	.147	.127	.366					
e	Corr	.335*	.050	.190	.170				
	Sig.	.014	.717	.283	.314				
f	Corr	.045	-.213	.403*	-.208	.266			
	Sig.	.756	.138	.022	.223	.062			
g	Corr	-.066	.008	.188	-.228	.157	.684**		
	Sig.	.651	.955	.304	.182	.276	.000		
h	Corr	.113	.030	.008	-.138	-.177	-.328*	-.182	
	Sig	.422	.831	.956	.417	.199	.020	.205	

Notes: **. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed). a = age, b = number of mental health medications, c = number of supplements, d = number of other prescriptions, e = waist circumference, f = systolic blood pressure, g = diastolic blood pressure, h = gender
N = 53 except N = 49 for systolic and diastolic blood pressure, N = 36 for other prescriptions and n = 33 for supplements

A regression model with significant ability to infer level of perceived risk of physical problems included risk level (high = 7 or above, low = less then 7) of HIP score,

months with mental illness, number of supplements taken, employment status, and SRAHP total score. This model is found to be $R^2 = 0.358$, $F(5,28) = 3.120$. $p= 0.023$. The model explains 35.8% of the variance in perceived risk of health problems score. The contributions to the model follow: self-efficacy for health total scale score, $t(28) = .189$, $p= 0.852$, hip risk level, $t(28) = .978$, $p = 0.336$, number of supplements (nosuppl), $t(28)$, -1.652, $P = 0.110$, employment, $t(28)$, -2.126, $p = 0.042$, number of months of mental illness, $t(28)$, -2.519, $p< 0.018$. The VIF levels were 1.0, 1.1, 1.1 for the variables tested in this model, showing no problems with multicollinearity. See Table 15 for results of this linear regression model.

Table 15

Regression Model with Perceived Risk of Health Problems as Dependent Variable: Additional Variables

Model	Beta	Std Error	Alpha
Constant	74.606		.001
SRAHP Total	.041	.031	.852
HIP - level	9.497	.153	.336
No Supplements	-3.850	-.253	.110
Employment	-19.20	-.331	.042
Mo MI	-.083	-.392	.018

Notes: R2 = 0.358 ($p< 0.023$). srahppt = self-efficacy for health post-test, HIP level= HIP score, high/lo, Employment = employed yes/no, Mo MI = month with mental illness

Table 15 Regression Model

Analysis

Overall, the actual level of physical health risk (HIP score) and perceived health risk (threat) have a minimal relationship with intention to follow-up with primary care

provider appointments in this study sample. The results of the HRS offered to participants showed no significant relationship between HIP risk score, perceived health risk, and intention to seek follow-up care. Participants reported a high level of intention to follow-up with a mean of 80 (scale 1-100). This could suggest social desirability influences (Gittelman et al., 2015). Asking a question about intention to follow-up can improve the chance that the individual will engage in the behavior being asked about according to a principle of question-behavior effect (Woods et al., 2016).

The most salient and impactful relationship found is that self-efficacy for health measured as SRAHP was significantly negatively related to level of health risk measured as total HIP score. Low levels of health risk related to higher levels of SRAHP and vice versa. The implications from this finding indicate that higher self-efficacy for health is linked to lower health risks or positive health promoting behaviors in individuals with SMI. Interventions developed to target improved self-efficacy for health may help mitigate physical health risk in individuals with SMI (Cook et al., 2015). Studies targeting self-efficacy in individuals with SMI have shown improved physical activity and weight management (Wilson et al., 2015), reduced cardiovascular risks (Sarkar et al., 2007), improved cancer prevention actions (Sakhvidi et al., 2015), and reduced smoking (Sterling et al., 2014).

Question one evaluated perceived health risk, self-efficacy for health, and physical health risk score relationship to follow-up with primary care in persons with SMI. Regression analysis found a lack of significant inference of level of intention to follow-up in primary care.

Question two asked about the relationship between physical health risk score and perceived health risk level for physical health problems in individuals with SMI. Correlational analysis found a lack of significant relationship between total HIP physical health risk score and perceived health risk ($r= 0.162$, $p = 0.742$). Findings suggest that participants with SMI may have a lack of capability to remember health risks as a non-SMI sample could. HRS and the overall rating of health risks did not show a significant relationship with perceived health risk in individuals with SMI.

The second part of question two evaluated self-efficacy for health and found in this sample SRAHP was significantly associated with perceived health risk. A significant inverse relationship was noted. Those with higher self-efficacy for health, SRAHP, reported lower perceived (and actual) physical health risk. The self-fulfilling nature of self-efficacy has been studied; those that feel more able to engage in positive health practices proceed to engage in more positive health practices and have reduced physical health risks (Sheeran et al., 2016). Previous studies have found self-efficacy increases in accordance with an individual's intention to act (Plotnikoff et al., 2010) and to take health behavior actions (Sheeran et al., 2016). This study found preliminary support for application in individuals with SMI of the principle that improved self-efficacy influences intention to act, at least as demonstrated through perceived health risk.

The third question explored the relationship of health risk score and perceived health risk level. Correlational analysis found a lack of significant relationship between total HIP physical health risks score and perceived health risk ($r= 0.162$, $p< 0.219$). Previous study in individuals with SMI has shown spurious and discrepant relationships

between physical health risk level and perception of risk and health behaviors. This aligns with PMT findings of reduced intention to take health protective behavior or actions if higher threat is perceived (Ruiter et al., 2014; Sheeran et al., 2014). This reduced intention to act is mediated by level of self-efficacy and occurs most with low level of self-efficacy in previous research. This mediation effect of self-efficacy level on future health protection action should be further studied. Interventions to improve health risk screening and positive (health protective) behaviors are difficult to design related to this contradictory relationship among cognitive appraisal processes that proceed health protective behavior (Ch'ng & Glendon, 2014).

Additional results

A significant correlation was noted between age and number of supplements taken and age and waist circumference. This suggests that as individuals with SMI age, there is an intensified need for interventions to reduce excessive weight. Systolic blood pressure was significantly correlated with gender. Males had significantly higher blood pressure in the current sample, as they also do in the general population (Sandberg & Ji, 2012).

Intention to follow-up and perceived health risk were not significantly related to gender, age, relationship status, diagnosis, or blood pressure. Study findings suggest targeting sub-populations of individuals with SMI for HRS based on these specific variables may not improve HRS gain or impact. Interventional HRS studies in populations with heterogeneous socio-cultural background and mental health diagnoses are limited. This study did not specifically address sociocultural background, other than recording ethnicity.

Being employed was negatively correlated with the perceived health risk item, so those who were employed experienced worse perceptions of their physical health risks. Those taking anti-psychotics were more likely to have elevated risk levels of physical health problems. Also, time since diagnosis of mental illness in months was significantly negatively related to perceived health risk and intention to follow-up with care. The variables of taking an anti-psychotic medication or not and months of mental illness are not practically modifiable.

Employment status in individuals with mental illness is something that can be influenced though supportive employment programs (Hoffman, Jackel, Glauser, & Kupper, 2012). Employment in those with SMI improves self-efficacy so has a potential mediating effect on health protective behaviors. Employment in individuals with SMI and its effect on self-efficacy is minimally quantified in the research literature.

Perceived risk of health problems was significantly negatively correlated with months taking mental health medications. The longer the participant was taking mental health medication and diagnosed with mental illness the lower their perceived level of health risk. This in counter-intuitive and should be studied with a larger sample size and further descriptive questions should be asked in order to understand how these individuals formulate their appraisal of their own risk for physical health problems.

A regression model with significant ability to infer level of perceived health risk included: level of HIP score, months with mental illness, number of supplements taken, employment status (yes or no), and SRAHP total score. Perceived health risk, as noted in the PMT and suggested by the findings of this study may be a more important and

influential intermediate factor in those with SMI than in age matched cohorts, in the cognitive appraisal process that leads to health promotion behaviors.

Health risk scores were not found to be related to perceived level of risk. Self-efficacy for health, measured by the Self-Reported Abilities for Health Practices (SRAHP) was significantly related to health risk level and perceived health risk. The study variables included in regression analysis were able to infer level of perception of health risk, accounting for 36% of the variance. Self-efficacy for health, an important component of PMT, is salient to HRS efforts in individuals with SMI, and warrants further investigation as an intervention to improve intention to take health protective behaviors.

Chapter 5

Discussion

Introduction

This section summarizes the rationale, background, and literature findings relevant to this study. The PMT guides this study and PMT components are discussed with application to study findings of HRS in individuals with SMI. Goals, design, and methodological considerations are summarized. Finally, findings are applied to the PMT, study goals, and recommendations for future study.

Nine percent of the U.S. population consists of individuals with serious mental illness (SMI) (Substance Abuse and Mental Health Services Administration, 2016). Individuals with SMI have higher rates of physical problems and die at younger ages than those without SMI (Razzano et al. 2015). These higher rates are worsening in degree, despite known preventative strategies, such as physical HRS (Laursen et al., 2014). Nurse led screening is well accepted and can improve HRS rate in individuals with SMI (van Meijel et al., 2015). This study addresses problems of HRS in individuals with SMI. HRS is often unstructured (Baller et al., 2015) and not community based (March et al., 2015), which limits effectiveness (Tosh et al., 2014). This study focuses attention toward addressing an insufficient level of follow-up for identified risks in individuals with SMI by asking participants about intentions to follow-up with primary care for identified health risks.

The PMT provides understanding of concepts relevant to HRS in individuals with SMI (Sheeran et al., 2016). The PMT identifies cognitive appraisal as having two components: risk appraisal and coping appraisal (Floyd, 2000). Coping appraisal, as in

previous research, was found to have a stronger influence than the other portions of the PMT on protection motivation or taking action for health (Ch'ng & Glendon, 2014). Self-efficacy has shown the strongest effects of all the identified coping appraisal components of the PMT (Bui et al., 2013). Self-efficacy for health indicates the degree to which an individual feels her or she can take care of his or her own health. Self-efficacy is ideally measured specifically for the activity of interest and is measured as self-efficacy for health in this study (Gandoy-Crego, 2016).

Risk appraisal has been previously noted to have limited, but variable impact on protective health behavior intentions (Sheeran et al., 2014). A single self-report item in this study measured risk appraisal (Bassett & McGinis, 2011). Late in the cognitive appraisal process of the PMT, intention to take action or protection motivation occurs (Floyd, 2000). Protection motivation was measured as intention to act. There is limited understanding of approaches to maximize coping appraisal and engagement in HRS in individuals with SMI (Aschbrenner et al., 2013; Susuki et al., 2011; Tidey, 2012). Thus, this study informs understanding of relationships of the PMT relevant to HRS in individuals with SMI.

The design of this study was correlational. The study used structured HRS with the HIP (White et al., 2010) in a population with SMI who lack HRS and follow-up for excess morbidity and mortality (Wheeler et al., 2014). The HRS tool was administered to adult ambulatory mental health clients from the Midwestern United States with SMI. A sample size of 54, above the minimum of 50 required for regression analysis (Vittinghoff & McCulloch, 2007) was used. Participants completed paper and pencil demographic and self-efficacy for health (SRAHP) tools. The HRS tool, the HIP, was

administered by face-to-face interview. Also measured were self-report perceived risk for health consequences and intention to follow-up with primary care providers. These concepts are found in the PMT. The research tested the relationship of the HIP as a HRS to: self-efficacy for health prevention behaviors, awareness of risk for health consequences, and intention to follow-up with medical care for health risks.

Conclusions

The study found that physical health risk level or severity and perceived health risk (threat) had a minimal relationship with intention to pursue care for the identified risks. There was also not a significance relationship between total HIP physical health risk score and perceived health risk ($r= 0.162$, $p = 0.219$). Previous study in individuals with SMI also showed spurious and discrepant relationships between physical health risk level and perception of risk and health behaviors.

This study found that high levels of self-efficacy for health, SRAHP, positively related to lower physical health risk level (total HIP score). This is similar to a finding of a HRS by Cook et al. (2015) which showed improved self-efficacy for health, SRAHP, in individuals who completed HRS. Individuals with SMI with high self-efficacy show improved health behaviors when interventions are applied (Goldberg et al., 2013), but those with low self-efficacy may be impaired from making efforts to improve physical health.

This study found that the SRAHP scale, specific to self-efficacy for health, inferred level of health risk and perception of health risk (threat) in the current sample of 54 individuals with SMI. There continues to be limited study of effects of HRS and self-efficacy in individuals with SMI (Cook et al., 2015). This study suggests in individuals

with SMI, higher levels of self-efficacy may influence intention to act. Interventions targeting improved self-efficacy for health may help mitigate the physical health risks of excess morbidity and mortality in individuals with SMI (Cook et al., 2015; Marks et al., 2005; Yarborough et al., 2015), when many other approaches have failed to reduce the inequity of health risk.

Employment is a potential mediating variable on health behaviors in individuals with SMI. Employment in individuals with SMI and its effect on self-efficacy is minimally quantified in research. Being employed was negatively correlated with perceived physical health risk rating, such that those who were employed experienced worse perceptions of their physical health risks.

Employment in those with SMI has shown preliminary improvement in self-efficacy, thus has a potential mediating effect on health protective behaviors (Varekamp, Verbeek, & van Dijk, 20016). Despite that self-efficacy was noted to be improved by pre-employment educational activities (Castle et al., 2016) and return to work (Brenninkmeijer, Lagerveld, S, Blonk, Schaufeli, & Wijngaards-de Meij, 2016), this study did not find a relationship between employment status and self-efficacy for health. Other research has also failed to find a significant relationship between employment status and self-efficacy (Raynor, Gill, & Gao, 2015).

Relationship of Findings to the PMT

A regression analysis was conducted using employment status, months of mental illness, number of supplements, and SRAHP to infer perceived risk of health problems. Results suggested that these independent variables accounted for 36% of the variance in perceived health risk. Components of the PMT measured in this study were HRS, a

measure of health threat, self-efficacy for health, and perceived health risk (threat). Perceived vulnerability was indirectly included in the perceived risk self-report item. Response efficacy or participants' perception of the likelihood that action would reduce risk was not directly measured. The summary of study findings related to perceived risk (threat) and self-efficacy for health are the focus of the application to the PMT.

Self-efficacy is a main component of coping appraisal in the PMT. Self-efficacy measured as Self-Reported Abilities for Health Practices, was significantly related to health risk level and perceived health risk. Self-efficacy is an influential component in the PMT as applied in this study. Self-efficacy is identified in the PMT as influential and predictive of health behaviors (Betz, 2013). Self-efficacy improvements, are found to be related to improved health behaviors (Yan et al., 2014). Specific measures of self-efficacy have been found to be predictive of specific health behaviors. This study used the self-efficacy scale, SRAHP, specific to health promotion behaviors of exercise, diet, psychological well-being, and health responsibility.

The SRAHP scale, measuring self-efficacy for health, inferred level of health risk and perception of health risk (threat) in a the current sample of individuals with SMI. This finding suggests that specific measures of self-efficacy for health are relevant in populations with SMI. Self-efficacy for health, an important component of the PMT, is salient to HRS efforts in individuals with SMI, and warrants further investigation as an intervention to improve intention to take health protective behaviors.

Self-efficacy as a component of cognitive appraisal before action to protect health (protection motivation) may be bolstered by specific interventions (Altassian Confluence, 2018). Peer modeling, self-observation, and goal-setting interventions have

shown promise in raising self-efficacy, particularly in those with low self-efficacy at base-line (De Jesus & Prapavessis, 2013; Pawa & Areesantichai, 2016). Self-efficacy for exercise was found to be less amenable to change than other types of self-efficacy (Olander et al., 2013). Self-efficacy for tasks, such as health protection behavior, can be trained using self-regulatory skills (Schwarzer, Antoniuk, & Gholami, 2015) to influence improvement of health behaviors and potentially improve physical HRS and follow-up medical care rates in individuals with SMI.

The PMT hypothesizes that individuals will have reduced intention to take health protective behavior or actions if higher threat is perceived (Ruiter et al., 2014; Sheeran et al., 2014). This reduced intention to act is mediated by level of self-efficacy and occurs most with low levels of self-efficacy in previous research. The nature of perceived risk (threat) in the cognitive appraisal process is noted to be variable in this study. Components that can impact perceived risk and intention to take action toward health are, also, not clearly identified in the literature (Ruiter et al., 2014).

There may be a differential and more prominent effect of perceived health risk, a PMT component, in those with SMI than in age matched cohorts. Perceived risk in the cognitive appraisal process leads to health promotion behaviors (Leas & McCabe, 2007). Interventions to improve health risk screening and positive (health protective) behaviors are difficult to design related to the contradictory relationship among cognitive appraisal processes including self-efficacy and perceived risk that precede health protective behavior (Ch'ng & Glendon, 2014). The present study finds a limited relationship between perceived risk and intention to follow-up in physical health care, consistent with the PMT.

Implications

There continues to be low rates of screening and treatment of physical health risks in individuals with SMI (Pitman et al., 2011). The findings suggest that not enough is known about aspects that impact health promoting behaviors in individuals with SMI. The PMT can lend understanding to the cognitive appraisal process for health promotion in individuals with SMI (Leas & McCabe, 2007). It is difficult to design studies that test health promotion in this population as the nature of the relationships among cognitive appraisal factors is variable (Sheeran et al., 2014). Self-efficacy has been found to have a consistent and positive influence on decisions in a way that protects health (Cook et al., 2015; Gohner et al., 2015; Yarborough et al., 2016).

This study found self-efficacy for health, measured by SRAHP, to have a negative relationship with health risk in individuals with SMI. Improved self-efficacy for health may contribute to reduced health risk. Interventions targeting self-efficacy for health are needed for individuals with SMI to attempt to reduce morbidity and mortality.

Limitations

The main methodological limitations of the study were the use of a convenience sample and the possibility of health bias in those that volunteered to participate. Potential differences between clinic and recovery group participants, limited settings (2), and measurement tool aspects were also methodological limits of the study. These limitations are described next.

The study sample size was small, limiting generalizability. Another factor limiting generalizability was lack of a randomized sampling method or control in the data collection settings (community setting used). Findings only apply to individuals

with SMI in similar rural geographic areas. Two sites (clinic and recovery group) were used to improve generalizability. Studies with larger numbers of individuals would improve reliability and generalizability. This is a suggestion for future research.

Participants in HRS are likely to be generally motivated to improve their health. Those less motivated for health improvement are likely to decline to participate, thus producing a sample biased towards health promotion. Prospective study participants that were offered participation agreed to participate at high rates, which suggested that wellness orientation bias may have had only a mild effect. It is an interesting finding that even a positively biased sample did not demonstrate a strong relationship between physical health risk level, perceived health risk, and intention to attend follow-up with medical care for their identified risks. This adds support to previous findings of difficulty in reducing rates of physical health risk in individuals with SMI (Moore et al., 2015).

Sampling variations may also have occurred between the clinic and recovery group participants. Use of specific inclusion criteria improved sample homogeneity. However, this study used a more diverse sample than previous studies have used with individuals with SMI (Leas & McCabe, 2007). Inclusion criteria helped standardize the sample and limit sampling bias. Diversity of the diagnosis of those who participated could have contributed to difficulty in finding relationships among study variables. The current study's diverse sample, though makes the sample more representative of outpatient populations of individuals with SMI who could present for HRS.

Self-report measurement, which was used for several of the HIP items, can be viewed as a study limitation. Individuals could have systematically reported more

positive health behaviors than they really engage in to attempt to appear less impaired or to present themselves in a more positive way. Also, individuals may have had social desirability bias in reporting their intent to follow-up in future care. Social desirability in onses has a higher effect in face-to-face interview and phone data collection than in online or other less direct forms of data collection. Indirect data collection has lower social desirability effects. This study quantified all data collected in a direct approach, limiting the chance of a variable (inequitable) influence of social desirability. Also the range of responses on the intention to follow-up item was broad with a large amount of variance which shows that social desirability was not extensive in this sample.

Community-based or clinical research, by its nature and design, uses patient report and survey tools for data collection (Saczynski, McManus, & Goldberg, 2013). Self-report data has potential reliability and validity limitations. Two aspects of the current study limit this possibility. The study used the HIP tool, which has had previous study and appears to be a valid representation of individual's physical health risk status (Shuel et al., 2010). Also, the researcher for the current study was trained in completion of the HIP, per the HIP protocol manual training, which increased the likelihood of reliable data being collected.

Bias by the researcher in completing the study tools is also possible, since data collection tools and HRS were administered by the researcher. Use of a standardized approach as outlined in the HIP administration manual limited variations in how the HIP was administered. Also, the data collection tools, including the demographic and additional data collection form were specific and structured, which limited biasing effects of the interviewer.

Recommendations for Further Research

Future General Adaptions to HRS Study in SMI

All the components of the PMT should be more specifically addressed in future studies to measure mediating influences on perceived health risk and physical health risk (HIP) rating (Ch'ng & Glendon, 2014). Measures of the PMT used that were non-significant may show a stronger relationship if a larger sample size was utilized. This study used the minimal sample size which may not be adequate to detect a low to moderate effect size. Previous studies using the PMT found a more complete explanation of protection motivation processes when all the components in the PMT were measured (Ch'ng & Glendon, 2014; Tulloch et al., 2009). Future study of HRS of individuals with SMI could use a different theoretical model. A model that includes consideration of attitudes in addition to cognitions such as the Theory of Planned Behavior (Tack et al., 2015) may be useful to explain variable perceptions of health risk and how they impact health protective behaviors.

Future research should strive to provide a stronger assurance that social desirability bias does not play a role. An alternative approach to data collection in the future is a less direct, electronic tool completion instead of face-to-face data collection. This may reduce the social desirability response. A less direct data collection approach would, however, likely reduce response rate and make recruitment of individuals with SMI even more difficult. The effects of social desirability are more effectively sorted out if direct and indirect measures are compared. This study quantified data collected in a direct approach, limiting the chance of variable (uneven) influence of social

desirability. Inclusion of a social desirability scale may help determine bias of social desirability (Vésteinsdóttir et al., 2015).

Health bias and sample diversity in HRS participants who have SMI is an area for further study to identify the most effective methods of sampling in this population. Ensuring diversity of diagnosis and ethnicity within a study sample is difficult to achieve in this population who already have low rates of participation in voluntary or additional care activities (Lamontagne-Godwin et al., 2018). Future study should target specific sub-groups of individuals with SMI. Populations for further study are individuals of different income levels and various ethnic backgrounds to identify the impact of targeted HRS and intervention.

In the future, study should be undertaken to quantify actual follow-up with primary care sometime after the intention to follow-up item is administered. Follow-up study assessing the actual follow-up in primary care of participants at two months after the HRS would reduce the impact of social desirability bias on the data, since it would be a known directly accessible variable instead of a self-report of intent to follow-up. The physical HRS, HIP, was designed to be administered yearly to individuals with SMI (White et al., 2012). Follow-up screenings at one-year post HRS baseline could measure the study variables longitudinally for changes in self-efficacy, perceived risk of health problems, and follow-up intentions and rates. Also, use of a comparison group which was not administered a health risk screening, (HIP) would strengthen the study design for future research.

Future Adaptation of Study Components

Future study of HRS in individuals with SMI could use alternative design and implement an intervention with a goal of reducing health risks and improving follow-up for physical health risks. If an intervention was included, randomization and a comparison group (that did not receive HRS) could be used to help quantify effects of assessing HRS in individuals with SMI. Specific measurement of cost, intrusiveness, stigma, and mental illness symptoms impacts should be considered when sampling individuals with SMI for HRS (Saczynski, McManus, Goldberg, 2013). These components could be considered in sampling by using a stratified sampling plan to quantify barriers (Polit & Beck, 2012c).

The data collection item developed for this study regarding perceived risk could be further tested using PMT as a foundation for HRS in SMI. Single item tools can be effective for non-complex phenomenon (such as intention to follow-up), according to Fuchs and Diamantopoulos (2009). Response rulers improve response rates to single-item tools (Kuhlman et al., 2016), but there is a lack of study of their psychometric properties (Boudreaux et al., 2012). Studies using PMT have frequently used one-item scales to assess components of the theory (Sterling et al., 2013). The reliability of the single-item PMT variables, however is not fully known (Fuchs & Diamantopoulos, 2009). Thus, future study of these measures is warranted.

The relationships among study variables could be further quantified to construct intervention strategies to improve health protective behaviors. Information about the relationship between employment, self-efficacy, and health promotion behaviors would assist quality of care and potentially reduce morbidity and mortality for individuals with

SMI. Employment status has been found to be correlated with quality of life (van Rijn, Carlier, Schuring, & Burdorf, 2016) in individuals with SMI. Thus, further study of impacts of quality of life, employment status, and self-efficacy on health risk screening interventions may yield improved efficacy of these interventions.

Future Study Summary

A priority direction for research suggested by this study is identification of ways to improve self-efficacy in individuals with SMI to positively impact health risk. Self-efficacy was found to relate significantly to perceived risks of health problems and could potentially affect interaction with care (Cook et al., 2015; Gohner et al., 2015; Yarborough et al., 2016). Improving measurement methods for HRS and its components and completing longitudinal study to quantify factors with the strongest link to improve health protection behaviors would add to what is presently known (McGinty et al., 2015). Improving self-efficacy, a component of the PMT, has the most consistent potential to increase HRS rates and follow-up once risks are identified.

Concluding Comments about Study Findings and HRS in SMI

There are low rates of HRS in individuals with SMI (Moore et al., 2105) and once screened, there are low rates of follow-up medical care for health risks (Goodrich et al., 2013; Lahti et al., 2014; McGinty et al., 2016). Despite HRS interventions, premature mortality and non-treatment of medical comorbidities in individuals with SMI has remained, with 30% diabetes and 88% of hyperlipidemia cases not receiving treatment (Lahti et al., 2012; Nasarallah, 2006).

There is limited study of effective approaches for administration of HRS to improve screening rates and outcomes of engagement in medical care for health risks

(Happel et al., 2015). Standardized HRS for medical multiple risks factors in individuals with SMI could improve screening rates and outcomes, but has thus far received limited study (Ho et al., 2015; Sakhvidi et al., 2015; Van Meijel et al, 2015). This study used standardized HRS and quantified multiple risk factors. This study takes initial steps toward a process for HRS, using the HIP tool, that gives follow-up recommendation and can contribute to increased intention to follow-up with care.

Effective HRS involves three components: assessment, brief advice, and referral or follow-up (Bartlem et al., 2014). This study includes all three HRS components. HIP administration included standardized screening and brief advice (White et al., 2014). The health risk report provided to participants functions to note, monitor, and record health risk symptoms and follow-up plans. This health risk report could be used in future research that measures and studies rates of follow-up in medical care.

Mental health nurses, with their direct role in the care of individuals with SMI, are uniquely equipped to foster standardized HRS and referral of these individuals to primary care to mitigate physical health risks (Rosenbaum et al, 2014; White et al., 2014). Future study of optimum processes for communication between mental health care and primary care providers about health risks of individuals with SMI could reduce physical health risks and improve health outcomes (Happell et al., 2014).

Findings support the ability of the PMT to provide relevant structure to HRS and intervention for physical health risks in SMI. PMT cognitive appraisal, coping and threat appraisal components were found to have a relationship with intention to follow-up with medical care for identified health risks. Self-efficacy for health, a coping appraisal component, was significantly negatively related to level of health risk (HIP

score) and to perception of health risk. Higher levels of self-efficacy related to lower levels of perceived health risk and measured health risk. Previous studies of PMT find the strongest influence on coping appraisal to be self-efficacy (Milne et al., 2000; Plotnikoff, et al., 2010). This study also found the strongest relationships to include self-efficacy for health among the HRS and study variables measured.

Threat appraisal, measured as perceived risk of physical health problems, was not found to directly and reliably relate to HRS and study variables. Perceived rewards of continuing with unhealthy behaviors such as use of tobacco for example (a threat appraisal component), may have more influence than perceived negative health threats for individuals with SMI (Yan et al., 2014). Barriers or response costs were minimally identified as: anti-psychotic medications taken, and lack of knowledge of potential health risks. Threat appraisal (perceived risk) was found to have minimal or variable relationship with intention to follow-up. Perceived risk findings align with previous study of PMT, which also noted spurious or variable effects of threat appraisal on protection motivation or intention to act (Ruiter et al., 2014; Tack, Ho, & Sun, 2015).

The study findings reiterate the complexity of the process of HRS in individuals with SMI. A recent review of health intervention studies designed to reduce excess mortality in individuals with SMI found one quality review study detailing HRS in individuals with SMI as an intervention approach (Baxter et al., 2016). However, there is negligible research of the impacts of HRS on outcomes in people with SMI (Tosh et al., 2014).

Limited understanding of cognitive appraisal and impact of cognitive appraisal may be impeding study of HRS in SMI. Further study of the cognitive appraisal

processes that impact intention to take health protective or preventive health behaviors may foster HRS study in individuals with SMI. Self-efficacy for health appears, from the limited indications in this study, to be a cognitive appraisal component that is significantly related to intention to follow-up with medical care for identified physical health risks. Self-efficacy is also a component of cognitive appraisal that from previous research could be amenable to change or improvement to bolster intervention efforts. Future studies could target improvement in self-efficacy for health to foster more effective interventions for individuals with SMI to improve health protective behavior.

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Appendix A

Table 1

Additional Measurement Tools to Quantify Protection Motivation Theory Components.

Measurement Tool Name	Aspects Measured	Reasons to Measure	Summary
Self-Rated Abilities for Health Practices (SRAHP)	Measure of Self-efficacy for health	Component of PMT, self-efficacy linked to likelihood of health behaviors	Positively correlated with other instruments that measure health self-efficacy
Perceived Risk of Health Consequences	Measure of perceived threat	PMT component the contributes to likelihood of health behaviors	Measure as a feature of Threat Appraisal in PMT
Intention to seek follow-up care	Assessment of self-reported intention to follow-up with care	To determine if follow-up (protection motivation) is related to HRS and Self-efficacy	Measure as a feature of Coping Appraisal in PMT

References: Becker, Stuifbergen, Oh, & Hall, 1993.

Appendix B

Table 2

Tools to Assess Self-Efficacy for Health.

Health Self-Efficacy Scale	Aspects Measured	Structure	Summary
Self-Rated abilities For Health Practices	28 items to self-rate how well they are able to perform health practices, in four areas: Exercise, Nutrition, Responsible Health Practices, Stress Management,	Semi-Structured, self-administered, 5-point Likert scale, four factors accounted for 62% variance in health practices. Cronbach's alpha total scale 0.94	Clinically validated, -r=0.43 compared to general self-efficacy scale, some validity with disabled,
Self-Efficacy for Health		Semi-structured, self-administered	Clinically tested, acceptability, feasibility tested, recommendations provided for risk areas
Competence for Health	Actually more of a measure of health literacy than self-efficacy for health	Structured	
		Structured, completed by interview with client	Helps clients identify goals regarding health risks, acceptable

References: Becker, Stuifbergen, Oh, & Hall, 1993.

Appendix C

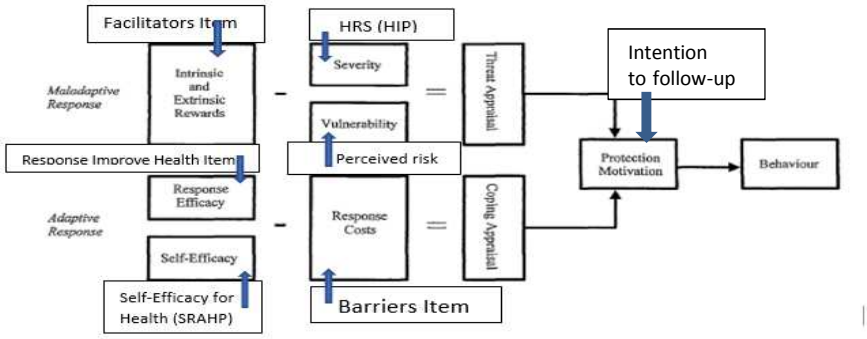

Figure 2. Concepts of PMT most salient to HRS in individuals with SMI and planned measurement of these concepts in this study. Barriers, Facilitators, and Response efficacy were not measured in this study.

Appendix D

Table 3

Comparison of Health Risk Assessment Scales.

Health Risk Assessment Scale	Aspects Measured	Structure	Summary
Blomstrand et al.	Vital Signs, Tobacco, Alcohol, Diet, Physical activity, Living condition, Mental stress, Waist to hip ratio	Semi-Structured, self-administered	Clinically, not empirically tested, no recommendations for risk areas
Health Improvement Profile (HIP)	27 areas of physical health assessed	Structured, administration process, health worker administrated interview	Clinically tested, acceptability, feasibility tested, recommendations provided for risk areas
Metabolic Syndrome Screening Tool (MSST)	Vital signs, waist circumference, blood sugar, lipid levels, medications, history	Structured, provider or health care worker completed	Protocol like assessment tool, no recommendations for risk areas, increases screening rates
Physical Health Check (PHC)	27 areas physical health assessed	Structured, completed by interview with client	Helps clients identify goals regarding health risks, acceptable

References: Blomstrand , Lindqvist, Carlsson, Pedersen, & Bengtsson, 2005, HIP; White, Gray, & Jones, 2009; MSST; Brunero & Lamont, 2009; PHC; Phelen et al., 2005.

Appendix E

Table 4

Pilot Study Descriptive Results

Variables	*M* (*SD*)
HIP no risk	17.69 (2.27)
HIP borderline risk	3.69 (1.87)
HIP risk	4.85 (2.62)
HIP total risk	8.54 (2.03)
Waist circumference	99.65 (0.32)
Body Mass Index (BMI)	32.36 (0.87)

Key: Health Improvement Profile (HIP) total scale average, and standard deviation for no risk, borderline risk, risk, total risk, waist circumference and Body Mass Index (BMI) of participants in the health risk screening. Pilot study data collected by the author.
Notes. Waist circumference is reported in centimeters

Appendix F

Protocol for Administration of Study Tools

Participants will complete the SRAHP, HIP, the Demographic Data Participant Form, and the Supplemental Data Collection Form. The data collector/s will complete the HIP HRS form and the Health Risk Report form which quantifies health risks found on the HIP.

The order of administration will be;

1) Demographic Data-Participant Form. This form will be completed by the participant.

2) Supplemental Data Collection form. This form will be completed by the data collector/s who asks the participants questions on the form. Additional demographic and medication regimen data will be collected on this form by the data collector/s.

3) Self-Rated Abilities for Health Practices (SRAHP) form. This form will be completed by the participant.

4) HIP. The data collector/s will retrieve data from the EMR and also ask the client the HIP form questions and record their answers onto the HIP form. The pre-HIP form will be optionally completed by participants before the interview after informed consent. This will help limit the time needed to collect some of the biological data the HIP form requires for completion.

5) The single item tools are administered for a second time. Perceived risk (threat) of health problems in the future and intention to follow up in the next two months.

Appendix G

Table 5

Health Improvement Profile (HIP) health risk assessment tool items.

HIP Item Category	HIP Item Category
1. Body Mass Index	15. Breast check (female and male)
2. Waist circumference	16. Menstrual cycle (female)
3. Pulse	17. Smoking status
4. Blood pressure	18. Exercise
5. Temperature	19. Alcohol intake
6. Liver function tests	20. Diet: 5-a-day
7. Lipid levels	21. Diet: fat intake
8. Glucose	22. Fluid intake
9. Cervical smear (women only)	23. Caffeine intake
10. Prostate and testicles check (men only)	24. Cannabis use
11. Sleep	25. Safe sex
12. Teeth	26. Urine
13. Eyes	27. Bowels
14. Feet	28. Sex satisfaction

Reference: Shuel et al., 2010.

Appendix H

HEALTH RISK REPORT

NAME YEAR OF BIRTH AGE DATE PARTICIPANT #

BLOOD PRESSURE BLOOD PRESSURE WEIGHT WC BMI

PROBLEMS ADDRESSED: Risk Screening Summary & Recommendations

MEDICATIONS Mental Health Medications # _____, Medical Medications # ____, Supplements #_____

Number, Borderline Health Risks: Number of Health Risks: Total Health Risks:

RISK FACTORS REVIEWED (FINDINGS INSERTED ARE ABNORMAL)

Diet _____

Exercise no regular exercise_____ times per week 30 minutes exercise _____ (ideal 5 days per week)

BMI _____ (normal range <25)

Waist Circumference _____ (<80 cm/ inches is ideal)

Smoking. packs per day ____ /chew; days per tin_____ past quit attempts_____ used_____

Potential Substance Use noted _____

Sexual Satisfaction Problems_____ Sexual Risk Factors Noted_____

Exams Due: Breast Exam/Mammo _____ Pap Smear _____ Testicular Exam _____ Prostate Exam_____

Liver Function Test; Last _____ Lipid Profile; last _____

Eye Exam Due last _____ Dental Exam Due last _____

RECOMMENDATIONS

1. List some standard recommendations here for circling of them

[Other]

HEALTH MAINTENANCE (enter date or check S=scheduled, D=done, P=Planned)

PRIMARY CARE ACTION	DATE (MO/YR)	LAB	FDATE (MO/YR)	OTHER (DESCRIBE)
Weight/BMI	☐ S ☐ D ☐ P	Blood Sugar	☐ S ☐ D ☐ P	
Waist Circumference	☐ S ☐ D ☐ P	Lipid Profile	☐ S ☐ D ☐ P	
Diet	☐ S ☐ D ☐ P	AST/ALT	☐ S ☐ D ☐ P	
Exercise Planned	☐ S ☐ D ☐ P	PSA	☐ S ☐ D ☐ P	
Smoking	☐ S ☐ D ☐ P	U/A SAS	☐ S ☐ D ☐ P	
Sexual Satisfaction	☐ S ☐ D ☐ P	Pap	☐ S ☐ D ☐ P	
Eye Exam	☐ S ☐ D ☐ P	Breast Exam	☐ S ☐ D ☐ P	

Dental Exam	☐ S ☐ D ☐ P	Mammogram	☐ S ☐ D ☐ P

S=scheduled P=planned D=done

OTHER RECOMMENDATIONS/REFERRALS/FOLLOW-UP:_____

Mental Health next exam_____ Primary Care next exam _____

☐ Update family/Surgical History/ROS Concerns:

Provider Signature:_____date_____

Appendix I

Male HIP

Health Improvement Profile [HIP] **(HIP) – Male**

Patient ID_____Other information_____Date of birth (age)_____
Ethnic
Classification_____Weight_____Height_____Date_____

Parameter	Level	Green		Red		Recommended action for red group
BMI		18.50-24.99[1]		< 18.50[1] ≥ 25.00[1*]		❒ BMI < 18.50 – refer for further investigations ❒ BMI ≥ 25.00 – advice and support on diet and exercise, referral to local weight/exercise management programme, consider medication review[2]
Waist Circumference		<94cm†[3]		≥94cm†[3]		❒ Advice and support on diet and exercise, referral to local weight/exercise management programme, consider medication review[2]
Pulse		60 – 100bpm[4]		<60 bpm/> 100bpm		❒ ECG should be performed[4]
Blood Pressure		<140/90[5]		≥140/90[5]		❒ Advice on weight loss (if overweight) and increased activity, reduction in alcohol intake, improved diet and smoking cessation[5] ❒ Refer to GP for further investigations[5]
Temperature		36-37.5□C[6]		<36 □C[7] >37.5□C[7]		❒ Abnormally high and accompanied by fluctuating BP and/or dystonia consider neuroleptic malignant syndrome ❒ Report to RMO, refer for further investigations[6]
Liver function (in last 3 months)		≤ 3 months		> 3 months		❒ Ensure that up-to-date LFTs are conducted ❒Abnormal – refer for further investigations[8] ❒ Slightly abnormal (> 2 times ULN) – repeat tests in 6 month's time, check alcohol intake, diabetes control and weight loss[8] ❒ Consider medication review[9]
Lipid Levels		TC < 5.1 mmol/L LDL – C < 4.1 mmol/L HDL – C > 1.0 mmol/L TG < 2.2 mmol/L[2]		TC ≥ 6.2 mmol/L LDL – C ≥ 4.1 mmol/L HDL – C< 1.0 mmol/L or TG ≥ 2.2 mmol/L[2]		❒ Refer to GP for appropriate treatment[2]
Glucose		< 6.0 mmol/L‡§[10] <48 mmol/mol (between 48-58 if has diabetes) [11]		≥6.0 mmol/L‡§[10] ≥ 48 mmol/mol (between 48-58 if has diabetes) [11]		❒ Check for symptoms of diabetes[2] ❒ Test for urine ketones if symptoms are present[2] ❒ Refer for further investigations and treatment[2]
Prostate and testicles		Once a month (testicular self-examination)[12]		Never		❒ Confirm prostate screening at fixed intervals for patients over 50 years[13] ❒ No recent PSA test – refer to GP or specialised practice nurse
Teeth		≤ 12 months[14]		≥ 2 years[14]		❒ Encourage regular visits to community dentist[14]
Eyes		≤2 years[15]		> 2 years[15]		❒ Prompt to self refer/refer to optometrist if no eye exam in last 2 years
Feet		Self-check occasionally		Never check		❒ Advice on keeping feet healthy[16] ❒ Elderly patients/those with diabetes – refer to chiropodist[16] ❒ If any presenting signs/symptoms – refer to chiropodist
Breast		Self-check occasionally		Never check		❒ Check risk factors for male breast cancer (i.e. previous radiotherapy, obesity, family history of breast cancer, high oestrogen levels or chromosomal syndromes)[17] ❒ Breast abnormalities – refer for further investigations[17]
Urine		1-2 litres/day[18]		< 1litre/day[18] > 2litres/day[19]		❒ Assess for signs of dehydration[18] ❒ Assess for symptoms of polyuria[19] ❒ Check for any urine frequency/incontinence issues ❒ Encourage fluids and implement fluid balance chart to evaluate

Bowels		No constipation / diarrhoea No excessive urgency/ straining/need for laxatives[20]		Diarrhoea, constipation, excessive urgency, straining, laxative use[20]		❒ Encourage fluids ❒ Check for gastrointestinal symptoms ❒ Check for any bowel urgency/incontinence issues ❒ Refer for further investigations
Sleep		7 – 8 hours[21]		< 3 hours[21] > 8 hours[21]		❒ Clarify sleep problem ❒ Provide education on good sleep hygiene and benefits of a sleep diary ❒Consider medication review ❒ Refer if relapse is suspected (refer to Risk and Relapse Plan and take action accordingly)
Smoking status		Non smoker		Passive smoker / smoker		❒ Advice that all smoking is associated with significant health risks[22] ❒ Refer to NHS Stop Smoking Services[18§§]
Exercise		30 minutes a day[23]		None		❒ Recommend 30 minutes of activity 5 days a week[23] ❒ Follow up on a 3-6 monthly period[23] ❒ Refer to exercise referral scheme if required[23]
Alcohol intake		3-4 units/day[24]		>4 units/day[24]		❒ Offer recommendations on sensible daily alcohol intake[24] (guide to alcohol units[25])
Diet: literacy 5 a day, fat, salt, carbohydrate intake[a]		5 fruit/veg a day [§§26] ≤ 90g***a day[27] ≤6g salt a day[28] ≤300g a day[27]		≤ 2 fruit/veg a day[26] ≥ 90g fat a day[27] ≥6g salt a day[28] ≥300g a day[27]		❒ Offer recommendations on reduction of health risks with healthy eating[26] ❒ Agree and implement a plan with the patient (and carers if appropriate)
Diet: function		Able to cook and shop Access to cooking facilities		Unable to cook or shop No access to cooking facilities		❒ Agree and implement a plan with the patient (and carers if appropriate) ❒Address potential barriers to accessing and eating fruit/vegetables[26] ❒ May include referral to other members of the MDT e.g. occupational therapist for meal planning, shopping and cooking skills
Fluid intake		1-2 litres/day[29]		< 1litre/day[29] > 3 litres/day[30]		❒ < 1 litre/day – check for signs of dehydration[29] ❒ Offer advice on increasing fluid intake[29] ❒ > 3 litres/day – check for signs of polydypsia[30] ❒ Implement a fluid balance chart ❒ Refer for electrolyte assessment if initial intervention unsuccessful
Caffeine intake[a]		200-500 mg/day[31***]		≥ 600mg/day[31]		❒ Check for signs of caffeinism or caffeine toxicity (> 1000 mg/day)[31] ❒ Offer advice to gradually reduce caffeine intake and limit withdrawal effects[31]
Cannabis use		Never		Occasional/Regular		❒ Implement health behaviour interventions and evaluate ❒ Work with support of dual diagnosis /service ❒ Systemically evaluate action e.g. using a Drug Use Scale
Safe sex		Always		Inconsistently/Never		❒ Identify if patient is in high risk group for STIs [32] ❒ Identify if patient is engaging in behaviours that increase risk of STIs[32] ❒ Provide sexual health advice ❒ If STI suspected refer to GP or sexual health practice nurse[32]
Sexual satisfaction		Satisfied		Dissatisfied		❒ Determine patient's level of sexual activity[33] ❒ Perform systemic assessment (e.g. Arizona Sexual Experience Scale) of the health parameter

[a]Where results fall between red and green ranges, increase frequency of monitoring and review. *Overweight = BMI > 23.00 in individuals of South Asian origin. [2 †]BMI for Europids – refer to ethnic – specific values where required. [§ **]Oral glucose tolerance test. Fasting plasma glucose. Ø glycated haemoglobin. ‡Random venous plasma glucose. [††]Warning – careful planning/medication review is required if smoking cessation planned. MHN to identify this need. [31 ‡‡]Five portions of a variety of fruit and vegetables. [§§]A portion of food high in saturated or transfat (e.g. meat products, hard cheese, butter/lard, pastry, cakes/biscuits, cream). Total fat considered high if more than 20g fat per 100g. [***]Average caffeine content – I cup of coffee = 75 – 100mg; 1 cup of tea = 50mg; 1 can of cola = 40mg; 1 energy drink – 90mg; bar of plain chocolate = 50mg; bar of milk chocolate = 25mg. [32]BMI – body mass index, ECG – electrocardiogram, HDL-C – high density lipoprotein – cholesterol, LDL-C – low density lipoprotein – cholesterol, STI – sexually transmitted infection, TC – total cholesterol, TG – triglycerides, ULN – upper limit of normal.

Other blood tests to consider: Prolactin, Urea and electrolytes and calcium, Thyroid function test, Full blood count, B12 and folate, Lithium levels, Vitamin D

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Appendix J

Female HIP **Health Improvement Prof** **[HIP] – Female**

Patient ID_____Other information_____Date of birth (age)_____

Ethnic Classification_____Weight_____Height_____Date_____

Parameter	Level	Green		Red		Recommended action for red group
BMI		18.50-24.99[1]		< 18.50[1] ≥ 25.00*[1]		❒ BMI < 18.50 – refer for further investigations ❒ BMI ≥ 25.00 – advice and support on diet and exercise, referral to local weight/exercise management programme, consider medication review[2]
Waist Circumference		< 80cm†[3]		≥80cm†[3]		❒ Advice and support on diet and exercise, referral to local weight/exercise management programme, consider medication review[2]
Pulse		60 – 100bpm[4]		<60 bpm/> 100bpm		❒ ECG should be performed[4]
Blood Pressure		<140/90[5]		≥140/90[5]		❒ Advice on weight loss (if overweight) and increased activity, reduction in alcohol intake, improved diet and smoking cessation[5] ❒ Refer to GP for further investigations[5]
Temperature		36-37.5□C[6]		<36 □C[7] >37.5□C[7]		❒ Abnormally high and accompanied by fluctuating BP and/or dystonia consider neuroleptic malignant syndrome ❒ Report to RMO, refer for further investigations[6]
Liver function (in last 3 months)		≤ 3 months		> 3 months		❒ Ensure that up-to-date LFTs are conducted ❒Abnormal – refer for further investigations[8] ❒ Slightly abnormal (> 2 times ULN) – repeat tests in 6 months' time, check alcohol intake, diabetes control and weight loss[8] ❒ Consider medication review[9]
Lipid Levels[a]		TC < 5.1 mmol/L LDL – C < 4.1 mmol/L HDL – C > 1.3 mmol/L TG < 2.2 mmol/L[2]		TC ≥ 6.2 mmol/L LDL – C≥4.1 mmol/L HDL – C< 1.3 mmol/L or TG ≥ 2.2 mmol/L[2]		❒ Refer to GP for appropriate treatment[2]
Glucose		< 6.0 mmol/L‡§[10] <48 mmol/mol (between 48-58 if has diabetes) [11]		≥6.0 mmol/L‡§[10] ≥ 48 mmol/mol (between 48-58 if has diabetes) [11]		❒ Check for symptoms of diabetes[2] ❒ Test for urine ketones if symptoms are present[2] ❒ Refer for further investigations and treatment[2]
Cervical smear		≤ 3 years (aged 25-64) ≤ 5 years (aged 50-64[12])		> 3 years (aged 25-64)[12] > 5 years (aged 50-64)[12]		❒ Refer to GP or specialist practice nurse[11]
Teeth		≤ 12 months[13]		≥ 2 years[13]		❒ Encourage regular visits to community dentist[13]
Eyes		< 2 years[14]		> 2 years[14]		❒ Prompt to self refer/refer to optometrist if no eye exam in last 2 years
Feet		Self-check occasionally		Never check		❒ Advice on keeping feet healthy[15] ❒ Elderly patients/those with diabetes – refer to chiropodist[15] ❒ If any presenting signs/symptoms – refer to chiropodist
Breast		Self-check monthly / routine breast screenings		Never check		❒ Advice on self-examination[16] ❒ Patients 50-70 years refer for breast screening (repeat every 3 years)[16] ❒ Breast abnormalities – refer for further investigations[17]
Menstrual cycle		Regular 28 day ovulation cycle (range:24-35 days)[18]		Irregular/Absent/ Reduced/Excessive[19]		❒ Refer for further investigations
Urine		1-2 litres/day[20]		< 1litre/day[20] > 2litres/day[21]		❒ Assess for signs of dehydration[20] ❒ Assess for symptoms of polyuria[21] ❒ Check for any urine frequency/incontinence issues ❒ Encourage fluids and implement fluid balance chart to evaluate
Bowels		No constipation / diarrhoea No excessive urgency/ straining/need for laxatives[22]		Diarrhoea, constipation, excessive urgency, straining, laxative use[22]		❒ Encourage fluids ❒ Check for gastrointestinal symptoms ❒ Check for any bowel urgency/incontinence issues ❒ Refer for further investigations
Sleep		7 – 8 hours[23]		< 3 hours[23] > 8 hours[23]		❒ Clarify sleep problem ❒ Provide education on good sleep hygiene and benefits of a sleep diary ❒Consider medication review ❒ Refer if relapse is suspected (refer to Risk and Relapse Plan and take action accordingly)

Smoking status		Non smoker		Passive smoker / smoker		❒ Advice that all smoking is associated with significant health risks[24] ❒ Refer to NHS Stop Smoking Services[24]††
Exercise		30 minutes a day		None		❒ Recommend 30 minutes of activity 5 days a week[25] ❒ Follow up on a 3-6 monthly period[25] ❒ Refer to exercise referral scheme if required[25]
Alcohol intake		2-3 units/day‡‡[26]		>3 units/day[26]		❒ Offer recommendations on sensible daily alcohol intake[26] (guide to alcohol units[27])
Diet: literacy 5 a day, fat, salt, carbohydrate intake[a]		5 fruit/veg a day §§[28] ≤ 70g***a day[29] ≤6g salt a day[30] ≤230g a day[29]		≤ 2 fruit/veg a day[28] ≥ 70g fat a day[29] ≥6g salt a day[30] ≥230g a day[29]		❒ Offer recommendations on reduction of health risks with healthy eating[28] ❒ Agree and implement a plan with the patient (and carers if appropriate)
Diet: function		Able to cook and shop Access to cooking facilities		Unable to cook or shop No access to cooking facilities		❒ Agree and implement a plan with the patient (and carers if appropriate) ❒Address potential barriers to accessing and eating fruit/vegetables[28] ❒ May include referral to other members of the MDT e.g. occupational therapist for meal planning, shopping and cooking skills
Fluid intake		1-2 litres/day[31]		< 1litre/day[31] > 3 litres/day[32]		❒ < 1 litre/day – check for signs of dehydration[31] ❒ Offer advice on increasing fluid intake[31] ❒ > 3 litres/day – check for signs of polydypsia[32] ❒ Implement a fluid balance chart ❒ Refer for electrolyte assessment if initial intervention unsuccessful
Caffeine intake[a]		200-500 mg/day[27†††]		≥ 600mg/day[33]		❒ Check for signs of caffeinism or caffeine toxicity (> 1000 mg/day)[33] ❒ Offer advice to gradually reduce caffeine intake and limit withdrawal effects[33]
Cannabis use		Never		Occasional/Regular		❒ Implement health behaviour interventions and evaluate ❒ Work with support of dual diagnosis worker/service ❒ Systemically evaluate action e.g. using a Drug Use Scale
Safe sex		Always		Inconsistently/Never		❒ Identify if patient is in high risk group for STIs[34] ❒ Identify if patient is engaging in behaviours that increase risk of STIs[34] ❒ Provide sexual health advice ❒ If STI suspected refer to GP or sexual health practice nurse[34]
Sexual satisfaction		Satisfied		Dissatisfied		❒ Perform systemic assessment (e.g. Arizona Sexual Experience Scale) of the health parameter ❒ Refer for gynaecological investigations/laboratory assessments[35]

where results fall between red and green ranges, increase frequency of monitoring and review. Overweight=BMI>23.00 in individuals of South Asian origin. †BMI for Europids – refer to ethnic-specific values where required. §**Oral glucose tolerance test. Fasting plasma glucose. Ø glycated haemoglobin. ‡Random venous plasma glucose. ††Warning – careful planning/medication review is required if smoking cessation planned. MHN to identify this need.[33] ‡‡Pregnant women should avoid drinking alcohol, if they do choose to drink, they should not drink more than 1-2 units once or twice a week. §§Five portions of a variety of fruit and vegetables. ***A portion of food high in saturated fat or trans fat (e.g. meat products, hard cheese, butter/lard, pastry, cakes / biscuits, cream). Total fat considered high if more than20g fat per 100g. †††Average caffeine content – 1 cup of coffee = 75-100mg; 1 cup of tea = 50mg; 1 can of cola = 40mg; 1 energy drink = 90mg; bar of plain chocolate = 50mg; bar of milk chocolate = 25mg. [34] BMI – body mass index, ECG – electrocardiogram, HDL-C – high density lipoprotein – cholesterol, LDL-C – low density lipoprotein – cholesterol, STI – sexually transmitted infection, TC – total cholesterol, TG triglycerides, ULN – upper limit of normal.

Other blood tests to consider: Prolactin, Urea and electrolytes and calcium, Thyroid function test, Full blood count, B12 and folate, Lithium levels, Vitamin D

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Appendix. K

Self-Rated Abilities for Health Practices Scale

SELF-RATED ABILITIES FOR HEALTH PRACTICES SCALE

The previous items asked how often you do different health practices. The following statements ask whether you are able to perform various health practices within the context of your lifestyle and any disabilities. This includes any assistance you have available to you (for example, an attendant to help with stretching exercises). Read each statement and use the following scale to indicate **how well you are able to do each of the health practices, not how often you actually do it.**

0 = Not at all

1 = A little

2 = Somewhat

3 = Mostly

4 = Completely

I AM ABLE TO:

1.	Find healthy foods that are within my budget	0	1	2	3	4
2.	Eat a balanced diet.....	0	1	2	3	4
3.	Figure out how much I should weigh to be healthy	0	1	2	3	4
4.	Brush my teeth regularly.....	0	1	2	3	4
5.	Tell which foods are high in fiber content	0	1	2	3	4

6.	Figure out from labels what foods are good for me	0	1	2	3	4
7.	Drink as much water as I need to drink every day	0	1	2	3	4
8.	Figure out things I can do to help me relax	0	1	2	3	4
9.	Keep myself from feeling lonely	0	1	2	3	4
10.	Do things that make me feel good about myself	0	1	2	3	4
11.	Avoid being bored	0	1	2	3	4
12.	Talk to friends and family about the things that are bothering me	0	1	2	3	4
13.	Figure out how I respond to stress	0	1	2	3	4
14.	Change things in my life to reduce my stress	0	1	2	3	4
15.	Do exercises that are good for me	0	1	2	3	4

0 = Not at all

1 = A little

2 = Somewhat

3 = Mostly

4 = Completely

I AM ABLE TO:

16.	Fit exercise into my regular routine	0	1	2	3	4
17.	Find ways to exercise that I enjoy	0	1	2	3	4
18.	Find accessible places for me to exercise in the community	0	1	2	3	4
19.	Know when to quit exercising	0	1	2	3	4
20.	Do stretching exercises	0	1	2	3	4
21.	Keep from getting hurt when I exercise	0	1	2	3	4
22.	Figure out where to get information on how to take care of my health	0	1	2	3	4
23.	Watch for negative changes in my body's condition (pressure sores, breathing problems)	0	1	2	3	4
24.	Recognize what symptoms should be reported to a doctor or nurse	0	1	2	3	4
25.	Use medication correctly	0	1	2	3	4

26. Find a doctor or nurse who gives me good advice about how to stay healthy 0 1 2 3 4

27. Know my rights and stand up for myself effectively 0 1 2 3 4

28. Get help from others when I need it 0 1 2 3 4

Becker, Stuifbergen, and Oh, 1993

Appendix L

Demographic Data-Participant Form Month of Data collection _____

Please complete the following questions. Your individual information is confidential. Please fill in the blank with the best answer or put an X next to the information that best describes you.

What is the month and year of your birth? _____ month _____ year

What is your gender? Male _____ Female_____ Other describe _____

What the highest level of education you have completed?

____Less than High School ____GED, High school diploma ____ Greater than High School

How would you describe yourself?

_____ Hispanic _____ American Indian or Alaskan Native _____ Black

_____ White _____ Asian or Pacific Islander _____ Prefer not to specify

What is your present relationship status?

_____ Married _____ Divorced or Separated _____ Prefer not to specify/don't know

_____ Widowed _____ Living with Partner _____ Never Married

What is your family size (number living in your household including yourself)? _____

Are there children under 18 years in your household, if so how many? _____

What is your current occupational status?

_____ Employed, part-time (24 or less hours per week) _____ Retired or disabled

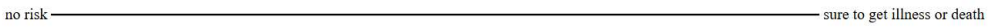
_____ Employed, full-time (40 hours or more per week) _____ Student

_____ Volunteer weekly, specify hours per week_____ _____ other, specify_____

When was you last visit to your primary care (medical) provider? Month _____ year _____

Who is your primary care provider? Clinic_____ Provider name_____

Rate your level of perceived threat (risk) of physical health problems by putting an x on the line below if the far left is no risk, and the far right is 100% chance of health problems if you do not change your current health practices



No risk mild risk moderate risk severe risk sure to get illness or death

Rate your level of intention to follow up with an appointment in primary care to address physical health risks in the next two months by putting an X on the line below if the far left is no intention to follow-up and the far right is 100% chance of follow up appointment

No intention possibly appointment likely appointment sure to make appointment

Demographics/Supplemental Data- Interviewer Form

What is the mental health condition/s this person was seen at this clinic for? (Check all that apply)

_____ Mood symptoms _____ Anxiety symptoms

_____ Bipolar mood symptoms _____ Schizophrenia or Schizoaffective symptoms

_____ Attention Deficit symptoms _____ Memory problems or dementia

_____ Personality difficulties _____ Post Trauma symptoms _____ Other specify_____

What is the primary condition(s) you take medications for?
Specify_____

List all current mental health medications and reasons for taking (record from those listed in EMR from previous visit)

1._____ reason_____ 5._____
reason_____

2._____ reason_____ 6._____
reason_____

3._____ reason_____ 7._____
reason_____

4._____ reason_____ 8._____
reason_____

Use back side of form for more medications if needed.

List all prescription medications taken for medical problems and describe if recent changes

_____

_____

_____

Describe medication changes from the EMR list (reconcile differences in actual medication taken from EMR list here).

Medication _____ Date changed_____ increase____ decrease____ other/reason____

Medication_____Date changed_____ increase____ decrease____ other/reason____

Use back side of form if needed.

Genetic testing done in past (Genesight) _____ yes _____ no

What is the year you were diagnosed with mental illness? _____ How many years ago was this? _____

How many years have you had treatment with mental health medication? _____

Appendix M

Informed Consent- Research Participation

Protocol Title: Relationship of use of Physical Health Screenings in Seriously Mentally ill with Self-Efficacy for Health, Perceived Risk, and Intention to Follow-up in Primary Care.

Principal Investigator (Emergency Contact): {Authors Contact Information was Listed Here}

Why am I being asked to volunteer?

You are being invited to participate in this research study because you are seen in the community for your mental health care. Your participation is voluntary and you can withdraw at any time without any negative effects on your medical care. You can ask questions or talk with family, friends, or your medical provider about participating. If you decide to participate, you will be asked to sign this form. Be sure you understand the risks and possible benefits of participating before you sign the consent form.

What is the purpose of this research study?

Study forms ask about health risks for physical health problems in individuals with mental health problems. Possible benefits include information about cardiovascular and metabolic risks.

What am I being asked to do?

It takes about 45 minutes to complete the study forms. 35 people will participate. You would complete an interview (face-to-face) with the researcher. The interview includes several paper-and-pencil forms asking about your interaction with medical and mental health care, physical health screenings you have had done, and review of information from recent out-patient mental health clinic visits or information you self-report about health risk screenings you have had done.

What are the possible risks or discomforts? What are the possible benefits?

Risks of participation are minimal. Learning of cardiovascular or metabolic risks present may lead to mild emotional distress. Questions which you do not answer will not affect your ability to continue to participate. If significant distress results you are free to stop participation at any time or contact the researcher. Benefits include increased identification of cardiovascular and metabolic health risks and medication effects and to referral for cardiovascular and metabolic health risks.

What if new information becomes available about the study?

During the course of this study, we may find more information that could be important to you. This includes information that, once learned, might cause you to change your mind about being in the study. We will notify you as soon as possible if such information becomes available.

What other choices do I have if I do not participate?

Since no drug or therapeutic device is included in this study the alternative to not participating is to continue with standard care for your out-patient mental health needs.

There is no penalty if you choose not to participate in the health risk screening research study, care will be given as it previously was without any penalty.

Will I be paid for being in this study? Will I have to pay for anything?

There is $15.00 being offered as compensation for the time required for you to participate in this study. The benefits to improving your health care regarding physical health risks is a non-monetary potential benefit. This study does not pay for or provide compensation for any procedures or tests done during the office visit and no tests are required to participate. Ask the study staff if you have any questions about bills, fees or other costs related to this study.

What happens if I am injured or hurt during the study?

If you have a medical emergency during the study you should contact the researcher listed on page one of this form. You may also contact your own doctor, or seek treatment outside of the Avera Behavioral Clinic. In the event of any physical injury resulting from research procedures, medical treatment will be charged to your insurance and financial compensation is not available.

When is the study over? Can I leave the study before it ends?

This study will end when all participants have completed the interview and data collection is complete. This study may be stopped by your physician, if any health or safety hazard is identified or you are unable to complete the survey tools. You will be asked if you are willing to be contacted to participate in a future research with the study

tools planned by the researcher. If you are willing to be invited to participate in the future you will need to sign another consent form.

Confidentiality of Study Records and Medical Records.

Information collected for this study is confidential. However, de-identified data will be reported in a written research report of the principal investigator's dissertation work toward Ph.D. completion. When data and analysis are presented, you will not be linked to the data by name, title or any other identifying item. Data will be kept in a password-protected electronic storage file. In the event of any publication regarding this study, your identity will not be disclosed.

Who can see or use my information?

Signing this form gives the researchers your permission to obtain, use, and share information about you for this study, and signing is required to participate. Information about you may be obtained from Midwestern Wellness Institute, Marshall, Minnesota and the clinic care providers. Information obtained may include information about your health and your medical care before, during, and after the study, even if that information wasn't collected as part of this research study. For example: Midwestern Wellness mental health records and test results.

Reasons information about you may be used or seen by the researchers during this study can be to verify you can participate, to maintain information in a confidential database, to check for test results, or to ensure the study is done properly. The Institutional Review Board for South Dakota State University may need to ensure the study is safe.

What happens to information about me after the study is over or if I cancel my permission? When does my permission expire?

As a rule, the researchers will not continue to use or disclose information about you, but will keep it secure until it is destroyed. Sometimes, it may be necessary for information about you to continue to be used or disclosed, even after you have canceled your permission or the study is over. This information would be used in a way that others would not be able to identify you specifically. Your permission will not expire unless you cancel it. You may cancel your permission at any time by writing to the researcher at address on the first page of this consent.

Who can I call about my rights as a research subject?

If you have questions regarding your participation in this research study or if you have any questions about your rights as a research subject don't hesitate to speak with the principal investigator, Dawn Van Ruler at the number listed.

If you have questions regarding your rights as a research subject, you may contact the South Dakota State University Review Board (IRB) at 1 605-688-5642. You may call this number to discuss or report any problems, complaints, or concerns you have about the study. You may also call this number if you wish to talk with someone who is independent of the study.

Volunteer's Statement

When you sign this form, you are agreeing to take part in this research study. This means that you have read the consent form, your questions have been answered, and you have decided to volunteer. If you have additional questions about taking part in this study or research-related injury, you may contact – Researchers Contact Information was Included Here".

You understand taking part in this research study is voluntary. You may quit the study at any time without harming future medical care or losing any benefits to which you might otherwise be entitled.

I have read and understand the above information. I agree to take part in this study. I will be given a copy of this document for my own record.

_____	_____	_____
Name of Subject (Please Print)	Signature of Subject	Date
_____	_____	_____
Name of Person Obtaining Consent (Please Print)	Signature	Date

Appendix N

Permissions to use The Serious Mental Illness Improvement Profile (HIP) tool

Jacquie White <Jacqueline.White@hull.ac.uk>
Mon 6/16/2014, 11:51 AM
Dear Dawn,

Yes I am the correct person regarding the HIP. I can easily send you a copy of the HIP but considering I have just completed a cluster RCT of it you may find it more helpful to have a chat about it.
It is free to use/adapt. We have a book coming out in a couple of months and hopefully a paper regarding the main results in the British Journal of Psychiatry.

In the meantime you can access a list of my publications that include all those so far published about the HIP at
http://www2.hull.ac.uk/fhsc/aboutus/staffcontactlist/jacquiewhite.aspx

With best wishes,
Jacquie

Jacquie White
Deputy Head of the Department of Psychological Health and Wellbeing
209 Dearne Building, Faculty of Health and Social Care,
University of Hull, Hull, HU6 7RX

Skype: Jacquiew23
01482 464537 (Direct Line), 01482 463342 Faculty Helpdesk
http://www.hull.ac.uk/fhsc

Self-Rated Abilities Health Practices (SRAHP) Tool Use Permission
VanRuler, Dawn

Appendix O

Self-Rated Abilities Health Practices (SRAHP) Tool Use Permission

heatherbecker@mail.utexas.edu;
VanRuler, Dawn
1/8/2017
Sent Items
Dear Dr. Becker
I am a phd student planning to measure self-efficacy for health as part of my dissertation research and learned of the self-rated abilities for health practices tool in an article published recently in Health values that you and other nurse researchers authored.

I am wondering how I would obtain permission to use this tool? Please respond back regarding this. I am working on proposal and would hope to begin the study in the next 3-4 months. I am studying health risk screening in those with Serious mental illness and using the protection motivation theory which includes consideration of self-efficacy in cognitive appraisal and eventual intention and action to prevent or reduce health risks.

Thank you for your time in considering this,
Dawn Van Ruler, CNS/NP, MS,Family mental health nurse practitioner, phd student

VanRuler, Dawn
heatherbecker@mail.utexas.edu
Sent Items
Jan 8, 2017
Dr Becker,
The article I am referring to was published in 1993, but I have been unable to locate how to seek permission to use the tool.
Thank you
Dawn Van Ruler

Dawn Van Ruler, RN, MS, CNS/NP

Becker, Heather A <hbecker@mail.nur.utexas.edu>
Mon 1/9, 12:08 PM VanRuler, Dawn

Thank you for your interest in the Self Rated Abilities for Health Practices Scale. You certainly have my permission to use it, and I have attached a copy for your use. There have been a number of articles that referenced its use, including some health promotion studies by Dr. Alexa Stuifbergen and I, so you should be able to obtain additional information about its use with various populations.